



# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV., PART II.—Extra Number, 1905.

*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. S. GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

### No. 16.

The present contribution commences with an account of the genus *Psychotria*, which concludes the Natural Order *Rubiaceæ*. In addition, it contains accounts of the Natural Orders *Valerianææ* and *Compositæ* (prepared by Sir G. King); *Stylidiææ*, *Goodenoviææ*, and *Campanulaceæ* (prepared by Mr. Gamble); *Vacciniææ* and *Ericaceæ* (Sir G. King); *Epacridææ* and *Plumbaginææ* (Mr. Gamble). For the new genera and species proposed in these Orders the authors are jointly responsible. The account of the Order *Monotropææ* has been supplied by Lieut.-Col. Prain, F.R.S., Superintendent of the Royal Botanic Garden, Calcutta; and that of the Order *Gentianææ* has been added, having been drawn up by Mr. C. B. Clarke, F.R.S., late President of the Linnean Society of London. It is somewhat out of its proper sequence, but has been included, as the descriptions were ready for publication.

In addition, therefore, to the account of the Rubiaceous genus *Psychotria*, with 29 Malayan Peninsular species, of which 11 are new to science, this fasciculus contains accounts of the Malayan members of 11 Natural Orders, including 48 genera and 81 species, of which 2 genera and 17 species are new to science.

Nat. Ord. LIX. RUBIACEÆ.

### 53. PSYCHOTRIA, Linn.

Shrubs or small trees, erect or occasionally climbing or twining; rarely herbs. *Leaves* opposite, rarely in whorls of 3 or 4. *Stipules* free in pairs, or connate, often with glands or hairs, deciduous or persistent. *Flowers* rather small, in terminal, rarely axillary, cymes

891.05

J.A.S.B.

1

24834

A372



corymbs or fascicles, bracteolate or not, never involucrate (in the Malayan species). *Calyx-tube* short; the limb persistent in part or deciduous. *Corolla-tube* straight, short; the throat naked or hairy; the lobes of the mouth 5, rarely 4 to 6, valvate in bud. *Stamens* as many as the corolla-lobes, inserted on the throat or mouth; anthers linear or obtuse, attached dorsally near the base to short or long filaments. *Ovary* 2-celled; style long or short, bifid; ovules often cuneiform, solitary, erect from the base of each cell. *Fruit* small, baccate or drupe-like, ovoid globose or oblong, smooth or ridged, composed of two plano-convex, 1-celled, 1-seeded pyrenes; or didymous and separating into two cocci. *Seeds* plano-convex, the ventral surface grooved or plane, the dorsal smooth, ridged or sulcate; testa thin, albumen hard; embryo small, basal; cotyledons broad, thin; radicle inferior.—DISTRIB. Species about 550; tropical or sub-tropical.

## Scandent:—

## Flowers 4-merous:—

Panicles lax; leaves elliptic- or oblong-lanceolate .. 1. *P. laxiflora*.

## Flowers 5-merous:—

Seeds with 4 ridges on the dorsal surface, the ventral surface plane:—

Flowers sessile in small capitula at the ends of the branches of the cymes:—

Leaves ovate to oblong-elliptic, 1.75 to 2.5 in. broad; inflorescence puberulous .. 2. *P. morindaeflora*.

Leaves narrowly elliptic, less than 1.25 in. broad; inflorescence coarsely pubescent .. 3. *P. Maingayi*.

Flowers pedicellate in cymosely branched cymes:—

Leaves elliptic-oblong to elliptic, the midrib sometimes pubescent on the lower surface, otherwise glabrous; main-nerves 7 to 10 pairs; petioles .4 to .75 in. long; fruit .25 in. long .. 4. *P. sarmentosa*.

Leaves narrowly elliptic-oblong, main-nerves 4 to 6 pairs; petioles .4 to .8 in. long; fruit .35 in. long .. 5. *P. Kunstleri*.

Leaves broadly obovate or sub-ovate; main-nerves 5 to 10 pairs; petioles .5 to 1.5 in.; fruit .4 in. long .. 6. *P. penangensis*.

Seeds with 3 ridges on the dorsal surface, the ventral surface plane:—

Flowers pedicellate, in cymosely branched paniculate cymes; fruit narrowly ellipsoid .. 7. *P. Scortechinii*.

Flowers on short pedicels in globular cymes at the ends of the branches of the panicles:—

Leaves and stems glabrous; fruit subglobose, .2 in. long .. 8. *P. pilulifera*.

Leaves and stems and branches densely pubescent .. 9. *P. Baileyi*.

Seeds with more than 4 ridges on both dorsal and ventral surfaces ..

CENTRAL ARCHAEOLOGICAL  
LIBRARY, NEW DELHI  
Acc. No. .... 2483  
Date ..... 13.12.56  
Call No. .... 89105 / F.A.S.B.

Seeds faintly ridged on the dorsal surface, the ventral surface with a shallow groove .. .. 11. *P. polycarpa*.  
Erect shrubs, usually small:—

Flowers 4-merous:—

Leaves with a strong pale intra-marginal nerve .. 12. *P. calocarpa*.

Flowers 5-merous:—

Flowers shortly pedicellate, in dense globular cymes at the ends of the long-peduncled branches of a terminal umbellate cyme; leaves deciduously puberulous, with 9 to 13 pairs of main-nerves; fruit .3 in. long; seeds 4-ridged on the dorsal surface, slightly concave on the ventral .. .. 13. *P. multicapitulata*.

Flowers sub-sessile, in short condensed dichotomous sessile axillary cymes; leaves with scurfy pubescence and 8 to 11 pairs of main-nerves; seeds 5-ridged on the dorsal and broadly grooved on the ventral surface .. 14. *P. tortilis*.

Flowers in a terminal umbellately branching cyme:—

Seeds with a single dorsal ridge, the ventral surface plane:—

Leaves quite glabrous:—

Leaves 6 to 10 in. long; main-nerves 12 to 15 pairs .. 15. *P. Griffithii*.

Leaves usually under 6 in. long, main-nerves 8 to 10 pairs .. 16. *P. angulata*.

Leaves adpressed-pubescent, 6 to 12 in. long .. 17. *P. Helferiana*.

Seeds with a single dorsal ridge, the ventral surface with a groove; leaves 5 to 8 in. long, quite glabrous, main-nerves 7 to 8, rarely 10 pairs .. 18. *P. montana*.

Seeds with 5 ridges on the dorsal surface, the ventral surface plane:—

Leaves glabrous:—

Leaves oblong-elliptic to oblanceolate-elliptic, 3.5 to 8 in. long; fruit .25 in. long .. 19. *P. viridiflora*.

Leaves softly pubescent:—

Leaves elliptic to elliptic-oblong, the bases cuneate rounded or cordate, 3.5 to 5 in. long; fruit .25 to .3 in. long .. 20. *P. Birchiana*.

Leaves elliptic, the upper surface glabrous except the midrib, 5 to 7 in. long; fruit .45 in. long .. 21. *P. fulva*.

Seeds 5-ridged on the dorsal surface and 2-grooved on the ventral; leaves glabrous on the upper surface, their margins crenulate .. 22. *P. fulvoidea*.

Seeds with 5 ridges on the dorsal surface and 1 ridge on the ventral; leaves glabrous, usually oblanceolate .. 23. *P. stipulacea*.

Seeds 4-ridged on the dorsal surface, plane on the ventral:—

Leaves elliptic, tapering equally to each end, 9- to 10-nerved; calyx-lobes very long caudate-acuminate .. 24. *P. Curtisi*.

Leaves obovate-oblong or obovate-oblanceolate, 10- to 14-nerved; calyx-lobes short, broad, blunt .. 25. *P. rhinocerotis*.

Seeds with 4 ridges on the dorsal surface and a faint groove on the ventral; leaves elliptic or elliptic-lanceolate, 12- to 18-nerved .. .. 26. *P. malayana*.

## SPECIES IMPERFECTLY KNOWN.

*Psychotria Wrayi*, No. 27.

„ *inequalis*, No. 28.

„ *condensa*, No. 29.

1. *PSYCHOTRIA LAXIFLORA*, Blume Bijdr. 964. Scandent or epiphytic, glabrous except the inflorescence; young branches slightly thicker than a crow-quill, terete, dark-coloured, brown, shining. *Leaves* membranous, narrowly elliptic- or oblong-lanceolate, much acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the lower the paler, midrib distinct; main-nerves 4 to 6 pairs, faint, curved, ascending; length 2 to 4 in.; breadth .5 to 1 in.; petiole .15 to .2 in. long. *Stipules* forming a tube from .15 to .3 in. long, sharply toothed. *Panicles* solitary, terminal, lax, more than half as long as the leaves, on naked peduncles about 1 in. long; branches cymose, with small acute bracteoles at their bases, puberulous. *Flowers* .15 to .2 in. long, puberulous, in cymes of three at the ends of the branchlets; their pedicels short, with broad acute caducous bracteoles at their bases. *Calyx* shortly funnel-shaped, the mouth sub-truncate or obscurely 4 toothed. *Corolla* longer than the calyx, broadly clavate in bud, funnel-shaped; the mouth with 4 broad obtuse lobes, throat sericeous. *Anthers* 4, elliptic, blunt, sub-sessile. *Fruit* clavate-ellipsoid, with 8 vertical ridges (2 of them double), glabrous; seeds with 4 bold ridges on the dorsal surface; the ventral surface quite flat. Miq. Fl. Ind. Bat. II. 187.

SINGAPORE: *Ridley* 13, 4828. JOHORE: *Ridley*. PERAK: *King's Collector* 4117, 8428; *Wray* 110.—DISTRIB. Sumatra, *Forbes* 1297, 1309, 1710, 2466; Java, *Koorders* 23550b.

2. *PSYCHOTRIA MORINDEFLORA*, Wall. Cat. 8438 A.B.C. in part. A woody climber, 15 to 20 feet long, glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, dark brown when dry, terete, somewhat thickened at the nodes, the internodes minutely lenticellate and faintly striate. *Leaves* coriaceous, ovate to elliptic, sometimes oblong-lanceolate, shortly and rather bluntly acuminate, the base slightly cuneate or rarely rounded; upper surface olivaceous-greenish when dry, the lower purplish-brown; the midrib channelled on the upper surface, prominent on the lower; main-nerves 6 to 8 pairs, rather straight, spreading, thin but rather distinct on both surfaces when dry; length 3 to 4.5 in.; breadth 1.75 to 2.5 in.; petiole



·2 to ·5 in. *Stipules* caducous, leaving a pale narrow scar between the petioles. *Cymes* terminal, about 2 in., rarely 3 in. long; the branches compressed and angled, scurfy-puberulous, two of them springing from the base, the other three umbellate at the apex of the main axis, each bearing at its apex a dense, many-flowered, minutely bracteolate capitulum less than ·5 in. in diam. *Flowers* ·2 in. long, sessile. *Calyx* cupular, the mouth with 5 small blunt teeth. *Corolla* twice as long as the calyx; the mouth with 5 deep oblong blunt lobes; throat densely sericeous. *Anthers* 5, short, elliptic, basifixed on stout filaments. *Style* cylindric, thickened upwards; stigma of 2 broad lobes. *Fruit* short, compressed ovoid-elliptic, with 8 vertical ridges (2 of them double) crowned by the small calyx, ·25 in. long and ·15 in. in diam. from front to back; seeds with 4 dorsal ridges; ventral surface plane. Hook. fil. Fl. Br. Ind. III. 166. *Psychotria*? Wall. Cat. 8355.

PERAK: *King's Collector* 2585, 2665; *Scortechini* 1826; *Wray* 4001. PENANG: *Wallich*; *Curtis* 478.

3. *PSYCHOTRIA MAINGAYI*, Hook. fil. Fl. Br. Ind. III. 166. A slender woody climber; young branches half as thick as a goose-quill, pubescent, ultimately pale and glabrous. *Leaves* thickly membranous, narrowly elliptic, caudate-acuminate, the base much narrowed; both surfaces glabrous, when dry pale olivaceous, the upper rather the darker; main-nerves about 6 pairs, indistinct on both surfaces like the midrib; length 2 to 3·25 in.; breadth ·65 to 1·2 in.; petiole ·1 to ·2 in., slender. *Stipules* cartilaginous, persistent, connate into a tube ·15 in. long with a few hairs at the truncate and toothed or acute apex. *Cymes* axillary, on slender, compressed, coarsely pubescent peduncles shorter than the leaves, few-branched. *Flowers* sessile, bracteoles linear. *Calyx* much longer than the pubescent ovary, widely campanulate; the lobes ovate-triangular, caudate-acuminate, spreading. *Corolla* unknown. *Fruit* broadly ellipsoid, with 8 deep vertical grooves, pale, nearly glabrous when ripe, ·2 in. long.

SINGAPORE: *Maingay* (K.D.) 926; *Ridley* 6924.

4. *PSYCHOTRIA SARMENTOSA*, Blume Bijdr. 964. Scandent; woody; young stems thinner than a goose-quill, pale, glabrous. *Leaves* thinly coriaceous, elliptic-oblongate to elliptic, acute or shortly and abruptly acuminate, much narrowed at the base, edges slightly recurved; both surfaces pale brown tinged with olivaceous when dry, minutely reticulate; the upper glabrous, the lower sometimes pubescent only on the stout midrib; main-nerves 7 to 10 pairs, curving slightly upwards, faint; length 2·5 to 4 in.; breadth 1 to 1·75 in.; petioles ·4 to ·75 in., winged above. *Stipules* broad at the base, the apex caudate-acuminate.

*Cymes* terminal, puberulous, shorter than the leaves, on short peduncles, cymosely branched; the branches angled, spreading, many-flowered; bracteoles minute, linear. *Flowers* about .15 in. long, puberulous outside, on short pedicels. *Calyx* campanulate, with 5 short triangular teeth. *Corolla* villous at the base in the interior. *Fruit* ellipsoid, .25 in. long, with 10 vertical ridges (2 of them double). *Seeds* with 4 dorsal ridges, the ventral surface plane. DC. Prod. IV. 522; Wight Ic. 1038; Thwaites Enum. Pl. Ceyl. 148; Kurz For. Fl. Burm. II. 14; Hook. fil. Fl. Br. Ind. III. 165. *P. obovata*, Wall. Cat. 8380. *Grumilea Junghuhniana*, Miq. Fl. Ind. Bat. II. 296. *Psychotria* sp., Wall. Cat. 8382, 8352 ?, 8384.

SINGAPORE: *Ridley* 2874, 2875, 9112. MALACCA: *Griffith* (K.D.) 3043. PERAK: *King's Collector* 4967, 7572. PENANG: *King* 1346; *Curtis* 951, 2781.—DISTRIB. Burma, *Wallich*; *Helfer* (K.D.) 3041, &c.; Indian Peninsula; Ceylon; Malay Archipelago; Andaman Islands.

VAR. *pachyphylla*, *King* & *Gamble*. *Leaves* thickly coriaceous, shining, greenish when dry, 3 to 4 in. long; fruit .25 in. long, subglobular.

PENANG: *Ridley* 9363; *Curtis* 2215.

5. *PSYCHOTRIA KUNSTLERI*, n. sp., *King* & *Gamble*. A glabrous epiphyte with slightly angled stems thinner than a goose-quill; pale yellowish when dry. *Leaves* succulent, glossy and bluish-green when fresh, but yellow on both surfaces and dull when dry, narrowly elliptic-oblong, rarely oblong-ob lanceolate, gradually and equally tapering to each end; the midrib bold, channelled on the upper surface; main-nerves 4 to 6 pairs, spreading, very indistinct; length 3 to 5.5 in.; breadth .8 to 1.4 in.; petioles .4 to .8 in. long. *Stipules* forming a cartilaginous persistent cup with an entire mouth, about .1 in. long. *Cyme* solitary, umbellate, terminal, longer than the leaves (the naked peduncle of 2 to 3 in. being included), lax, from 2 to 4 in. broad; branches spreading, dividing near their apices into umbellate cymes; bracteoles few, linear, acute. *Flowers* not seen: on basally bracteolate pedicels as long as themselves. *Fruit* .35 in. long, ellipsoid, deeply 10-grooved, crowned by the rather large remains of the 5-toothed calyx, 10-ridged. *Seeds* dorsally 4-ridged, the ventral surface flat.

PERAK: *Scortechini*; *King's Collector* 1886, 4953, 6588; *Wray* 2230.—DISTRIB. Sumatra, *Forbes* 2823.

6. *PSYCHOTRIA PENANGENSIS*, *Hook. fil. Fl. Br. Ind. III. 175*. A shrubby epiphyte or climber, 8 to 12 feet long, all parts except the inflorescence glabrous; young branches slightly compressed, thinner than a goose-quill, dark-coloured. *Leaves* thinly coriaceous, broadly elliptic-obovate or sub-ovate, shortly and abruptly triangular, acuminate.

nate, much narrowed at the base into the broad petiole; both surfaces brown when dry, the upper slightly olivaceous; the midrib broad, channelled on the upper surface, main-nerves 5 to 10 pairs, spreading, thin, distinct on the lower surface; length 3 to 4.5 in.; breadth 1.5 to 2.5 in.; petiole .5 to 1.5 in. long, slightly winged above. *Stipules* broadly ovate, sub-acute or blunt, sub-tubular, sometimes bifid, .2 to .4 in. long. *Cymes* umbellate, solitary or terminal, pedunculate, as long as or longer than the leaves (including the compressed naked 1 to 2 in. long peduncle); primary branches long, spreading; the ultimate umbels with broad-based subulate unequal bracteoles. *Flowers* .2 to .25 in. long, sessile or on short pedicels; bracts .25 in. long. *Calyx-tube* obconic, its teeth triangular. *Corolla* longer than the calyx, shortly and widely tubular, deeply divided into 5 broad lobes thickened near the apex, the apex itself sharp and inflexed, glabrous inside except for the ring of hair in the throat at the insertion of the short filaments. *Anthers* elliptic, blunt, entire. *Fruit* ellipsoid, compressed, with 10 obtuse vertical ridges (2 of them double), glabrescent, crowned by the rather large calyx; length .4 in.; breadth .25 in. *Seeds* 2, plano-convex, the dorsal surface with 4 blunt ridges, the ventral surface plane.

MALACCA: *Maingay* (K.D.) 920. SINGAPORE: *Ridley* 2870. PERAK: *Scortechini* 2034; *King's Collector* 3049, 4591, 10723. SELANGOR: *Ridley* 7425. PANGKORE: *Curtis* 1621.

7. *PSYCHOTRIA SCORTECHINII*, n. sp., King & Gamble. A climber, all parts glabrous; young branches pale brown, thicker than a crow-quill, terete, smooth. *Leaves* membranous, ovate-lanceolate or narrowly elliptic, acuminate, the base narrowed or rarely rounded; both surfaces brown when dry (the lower slightly paler), the midrib prominent; main-nerves 5 or 6 pairs, curved, spreading, not prominent; length 2.5 to 4 in.; breadth 1 to 1.5 in.; petiole .15 to .2 in. *Stipules* oblong, acute, connate at their bases, .15 to .2 in. long, caducous. *Cymes* paniculate, solitary, terminal, rarely axillary, spreading, lax, cymosely branched, in flower as long as or nearly as long as the leaves, in fruit longer, the branches bracteolate, angled, divaricating. *Flowers* on the ultimate branchlets in threes, .15 in. long, on short pedicels, each with a bracteole at the base. *Calyx* cupular, with 5 short acute teeth. *Corolla* longer than the calyx, cylindric, with short triangular lobes, the throat with tufts of yellowish hairs between the 5 stamens. *Anthers* on short filaments. *Style* cylindric, stigma 2-lobed. *Fruit* narrowly ellipsoid, tapering to each end, sometimes clavate, slightly compressed, 8-ridged (2 being double), crowned by the calyx, .35 in. long and .2 in. in diam. *Seeds* with 3 broad dorsal ridges, ventral surface plane.



PERAK: *Scortechini* 311, 404, 426; *King's Collector* 897, 2566, 5373.

This closely resembles *P. laxiflora*, Bl., but has 5-merous flowers and longer, less clavate fruit.

8. *PSYCHOTRIA PILULIFERA*, n. sp., King & Gamble. A small tree or climber; all parts except the inflorescence glabrous; young branches about as thick as a crow-quill, terete, pale brown when dry. *Leaves* coriaceous, narrowly elliptic, much tapered to both ends; both surfaces olivaceous when dry, the lower slightly the paler; main-nerves 6 or 7 pairs, inconspicuous, the midrib bold beneath when dry; length 2·5 to 3·5 in.; breadth ·75 to 1 in.; petiole ·35 to ·4 in. long, slender. *Inflorescence* a terminal, few-branched, puberulous panicle of condensed 8-10-flowered globular cymes. *Flowers* and their short pedicels minutely tomentose. *Calyx* shortly campanulate, the mouth with 5 spreading triangular acute lobes. *Corolla* tubular; the lobes oblong, broad, with small inflexed apices. *Anthers* 5, attached to the throat by short filaments surrounded by coarse hair. *Fruit* sub-globose, with 10 bold vertical ridges (2 of them double), crowned by the small calyx, ·2 long and ·15 in. in diam. *Seeds* with 3 bold ridges on the dorsal surface; ventral surface plane.

PERAK, at elevations of 3,000 to 5,000 feet: *Wray* 287, 398, 434, 946, 3870.

9. *PSYCHOTRIA OVOIDEA*, Wall. Cat. 8383. A slender woody climber, 20 to 40 feet long; stems thinner than a goose-quill, densely rusty-pubescent. *Leaves* with recurved margins, coriaceous, ovate- or elliptic-lanceolate, shortly acuminate, the base cuneate or rounded, sometimes minutely cordate; upper surface olivaceous when dry, glabrous, the main-nerves depressed; the lower brown, pubescent on the stout midrib and 5 to 7 pairs of prominent curved ascending main-nerves, puberulous on the interspaces; length 1·5 to 2·5 in.; breadth ·85 to 1·25 in.; petioles ·15 to ·25 in. long. *Stipules* connate, ovate-lanceolate, ·25 in. long, caducous. *Cymes* ·75 to 2 in. in diam., trichotomous, solitary, terminal, rusty-pubescent, on angled peduncles ·5 to 1 in. long. *Flowers* about ·15 in. long, on short pedicels, crowded in dense cymes at the ends of the branches and mixed with linear bracteoles. *Calyx* campanulate, with 5 spreading acute teeth. *Corolla* twice as long as the calyx, salver-shaped, with 5 lobes, the tube villous inside. *Fruit* ovoid-globose, ·15 in. long, the apex crowned by the calyx, the sides with 6 faint vertical ridges. *Seeds* faintly 3-ridged on the dorsal surface; the ventral surface broad, flat. Hook. fil. Fl. Br. Ind. III. 166.

SINGAPORE: *Wallich*, *Seeman* 2348. MALACCA: *Maingay* (K.D.) 923; *Ridley* 97, 8407.

10. *PSYCHOTRIA RIDLEYI*, n. sp., King & Gamble. A small shrub; all parts glabrous except the inflorescence; stems half as thick as a goose-quill, terete, greenish when dry. *Leaves* membranous, oblong-to elliptic-oblongate, the apex abruptly and very shortly acuminate, the base much narrowed, both surfaces pale olivaceous when dry, the midrib rather prominent, the upper sometimes with scattered minute, adpressed white hairs; main-nerves 7 to 9 pairs, slightly curved, spreading, faint on both surfaces; length 3 to 5.5 in.; breadth 1.25 to 2.25 in.; petioles .4 to .8 in. long, winged near the apex. *Stipules* broadly ovate, subacute, .1 in. long. *Cyme* on a peduncle about 1 in. long (longer in fruit), corymbosely branched, the bracts at the forks linear-lanceolate. *Flowers* in cymes of three, everywhere canescent, on short pedicels bibracteolate at the base. *Calyx* campanulate with elongated tube; the mouth with 5 erect ovate-triangular lobes. *Corolla* longer than the calyx; the tube short, slightly villous at the base near the insertion of the broad sub-sessile anthers; the 5 lobes broadly ovate, acute. *Fruit* ovoid-ellipsoid, 12-ridged, crowned by the small calyx, .3 to .4 in. long. *Seeds* many-ridged on both dorsal and ventral surfaces.

SINGAPORE: *Ridley* 48, 10818. JOHORE: *Ridley* 6472. MALACCA: on Mt. Ophir, *Hullett* 811; *Goodenough* 1363.

11. *PSYCHOTRIA POLYCARPA*, Hook. fil. Fl. Br. Ind. III. 165. A climber, glabrous except the inflorescence; young branches thinner than a goose-quill, terete, when dry dark-coloured. *Leaves* coriaceous, ovate- or obovate-lanceolate to obovate- or ovate-rotund, the apex in the narrower forms shortly and bluntly acuminate, in the broader abruptly and bluntly apiculate; both surfaces olivaceous when dry, the upper somewhat shining, the lower dull and darker, the midrib prominent on both; main-nerves 5 or 6 pairs, spreading, faint on both surfaces; length 2 to 3 in.; breadth .75 to 1.75 in.; petioles .3 to .6 in. *Stipules* very short, connate to form a collar, caducous. *Panicles* large, umbellately cymose, longer than the leaves (sometimes very much so); their branches numerous, spreading, puberulous, with minute bracteoles at the divisions. *Flowers* .15 in. long, numerous, in ultimate cymes of 2 or 3, shortly pedicellate. *Calyx* thick, minutely pubescent, shortly campanulate or sub-cupular, the mouth with 5 acute teeth or subentire. *Corolla* longer than the calyx, salver-shaped, its 5 lobes spreading, lanceolate, acute, the throat sericeous; anthers 5, elliptic. *Fruit* ellipsoid, tapered to the base, and the apex crowned by the rather large remains of the calyx; obscurely ridged; .15 in. long and .1 in. in diam.; sometimes sub-globular, the epicarp somewhat pulpy. *Seeds* slightly convex and faintly ridged on the dorsal surface, the ventral with a broad

shallow groove. *P. obovata*, Wall. Cat. 8380A. *Grumilea polycarpa*, Miq. Fl. Ind. Bat. II. 295.

SINGAPORE: *Ridley* 2029. MALACCA: *Griffith* (K.D.) 3042; *Main-gay* (K.D.) 924; *Hullett* 402. JOHORE: *Ridley* 4090, 11160. PENANG: *Curtis* 1095. PERAK: *Wray* and *King's Collector* many numbers. DISTRIB.—Java, *King*; *Forbes* 1061; *Koorders* 28043B.

12. *PSYCHOTRIA CALOCARPA*, Kurz in Journ. As. Soc. Beng., 1872, II. 315. A glabrous shrub 2 to 4 feet high; young branches thinner than a goose-quill, dark-coloured when dry. *Leaves* thickly membranous, oblong-ob lanceolate or oblanceolate, shortly caudate-acuminate at the apex, much attenuate at the base, the edges sometimes broadly crenate; both surfaces olivaceous when dry, the midrib and nerves broad, distinct and pale; main-nerves 10 to 12 pairs, slightly curved, spreading and interarching to form a bold pale intramarginal nerve .1 to .15 in. from the edge; length 5 to 8 in.; breadth 1.65 to 2.5 in.; petiole .75 to 1.25 in., slightly winged near the apex. *Stipules* broadly triangular, acuminate, membranous, sometimes bifid, .2 in. long. *Cymes* terminal or axillary, sessile or shortly pedunculate, shorter than the petioles, about 1.25 in. across and .5 in. long, branched from near the base, the branches compressed, trichotomous; the bracteoles lanceolate, acuminate. *Flowers* .2 in. long, on short pedicels. *Calyx* with a short cylindric tube and 4 longer oblong blunt sub-erect concave lobes. *Corolla* exceeding the calyx, narrowly campanulate, bluntly 4-lobed, the throat densely sericeous, otherwise glabrous. *Fruit* sub-globose or ovoid, sub-compressed; the epicarp fleshy, glabrous, rugulose when dry; .3 in. in breadth and rather less in length, the persistent calyx-lobes small. *Seeds* large, the dorsal surface faintly 1-ridged, the ventral deeply grooved. Kurz For. Fl. Burm. II. 9; Hook. fil. Fl. Br. Ind. III. 173. *P. asiatica*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 160; Wall. Cat. 8331: not of Linn. nor of Roxb. *P. viridiflora*, Reinw. var. *undulata*, Kurz For. Fl. Burm. II. 13. *P. picta*, Wall. Cat. 8353; and *Psychotria*, l.c. 8359.

PERAK: *Ridley* 7199; *Wray* 2200; *King's Collector* 1930, 2348, 6798, 10772; *Scortechini*. MALACCA: *Hervey*.—DISTRIB. Himalaya, Assam, Burma.

This plant is very common in the lower Himalaya, Assam, and Burma. In the Flora of British India it is described as herbaceous, but the Malayan specimens are all woody. The leaves are always readily distinguished, when dry, by the pale broad main-nerves and by the very conspicuous intra-marginal nerve. In Malaya the plant is glabrous, but in the Indian specimens the under surfaces of the leaves are decidedly puberulous.

13. *PSYCHOTRIA MULTICAPITATA*, n. sp. King & Gamble. An erect



much-branched shrub 3 to 7 feet high; young branches thinner than a goose-quill, slightly compressed, swollen at the nodes, pale, deciduously puberulous. *Leaves* thinly membranous, greenish when dry, broadly obovate-lanceolate, oblong or elliptic, abruptly and shortly caudate-acuminate, the base narrowed to the rather short petiole; upper surface quite glabrous; the lower scurfy-puberulous on the broad midrib and 9 to 13 pairs of curved spreading main-nerves; length 5 to 10 in.; breadth 2.5 to 4 in.; petiole .75 to 1.15 in. *Stipules* free, broadly triangular, .15 in. long. *Cymes* terminal, solitary, peduncled, about 2 in. long (including the peduncle) and the same in breadth, umbellately branched from near the base; the ultimate branches numerous, bearing terminal many-flowered globular minutely bracteolate cymes, about .5 in. in diam., the common peduncle about an inch or more long, the branches shorter, all puberulous. *Flowers* on short puberulous pedicels, ovoid in bud, about .15 in. long when expanded. *Calyx* cupular, with 5 or 6 triangular acute sub-erect teeth. *Corolla* longer than the calyx, the tube cylindric and, like the throat, densely white-sericeous inside; lobes of the limb short, triangular, deflexed. *Anthers* bifid at the base. *Style* thick, bifid, longer than the corolla. *Fruit* ellipsoid-obovoid, 10-ridged, crowned by the small calyx, glabrous, .3 in. long. *Seed* dorsally with 4 faint ridges, ventrally somewhat concave.

PERAK: *Scortechini* 214, 291; *King's Collector* 436, 867, 2862, 5402, 7380, 7513, 10559.

14. *PSCHYTRIA TORTILIS*, Blume Bijdr. 958. Stem woody below, erect, 6 to 18 in. high, not branched, cinereous, 4-angled, sparsely covered with short coarse scurfy hairs. *Leaves* membranous, broadly elliptic or ovate-elliptic, the apex acute or sub-acute, narrowed from below the middle to the petiole; upper surface when dry dark green, the lower pale, glaucous, minutely lepidote; the 8 to 11 pairs of slightly curved spreading main-nerves covered with minute short coarse deciduous dark-coloured hairs; length 4 to 6 in.; breadth 1.75 to 3 in.; petioles .5 to 2 in., compressed, scurfy-pubescent. *Stipules* broadly triangular, much acuminate, bifid, .15 to .3 in. long. *Cymes* solitary, sessile, axillary, dichotomous, many-flowered, condensed, .5 in. to 1 in. long and as much broad. *Flowers* .15 in. long, on short ebracteolate pedicels. *Calyx* campanulate, with 5 triangular spreading teeth, covered with coarse hair. *Corolla* longer than the calyx, narrowly campanulate, with 5 ovate acute lobes, hairy like the calyx. *Anthers* 5, sessile, oblong, blunt, included. *Style* shorter than the calyx; stigmas short, linear, divergent. *Fruit* crowned by the small calyx-lobes, reniform, pale with numerous short vertical brown streaks, and stiff short white hairs, .1 in. broad and less in length; the dorsal surface of each of the two

cartilaginous cocci with 3 bold ridges. *Seeds* bluntly 5-ridged on the dorsal, broadly grooved on the ventral surface. DC. Prod. IV. 520; Hook. fil. Fl. Br. Ind. III. 169. *P. microcarpa*, Wall. Cat. 8344. *Streblusa tortilis*, Korth. Kruidk. Arch. II. 246.

PENANG: Wallich 8344; Curtis 405, 1269. SINGAPORE: Lobb. PERAK: King's Collector 710, 2627; Seortechini.—DISTRIB. Sumatra, Forbes 1495.

15. *PSYCHOTRIA GRIFFITHII*, Hook. fil. Fl. Br. Ind. III. 171. A shrub; glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, terete, of a dark colour when dry. *Leaves* coriaceous, oblong or elliptic, shortly and somewhat abruptly acuminate, the base cuneate, the edges slightly recurved and pale, both surfaces drying olivaceous-green, shining, the midrib and the 12 to 15 pairs of curved spreading main-nerves distinct; length 6 to 10 in.; breadth 1·75 to 3·5 in.; petiole ·4 to ·8 in., slightly winged above, stout. *Stipules* broadly triangular, sub-acute, ·2 to ·3 in. long. *Cymes* terminal, solitary, pyramidal, about 1·5 in. long and the same in breadth, on naked compressed peduncles 1·5 in. or more long (lengthening to 2 in. or more in fruit); branches short, stout, puberulous, ebracteolate; the ultimate ones bearing the shortly pedicelled flowers in cymes of three. *Flowers* ·2 in. long. *Calyx* campanulate, with 5 broadly triangular acute sub-erect teeth. *Corolla* as long as the calyx, fleshy, tubular, with 5 broad oblong hooded lobes; the tube finely sericeous inside, otherwise glabrous. *Anthers* 5, broadly oblong, entire, dorsifixed; the filaments thin, compressed, broad. *Style* short, with 2 broad flat lobes. *Fruit* elliptic, slightly obovoid, the apex subtruncate, crowned by the remains of the disk and calyx, glabrous, black when dry, ·4 in. long and ·35 in. broad; with 4 broad vertical ridges, two of them grooved externally and consisting of two ridges united, the other two single; 2-celled, and 2-seeded. *Seeds* large, the dorsal surface with a single ridge, the ventral flat, not grooved, everywhere smooth.

MALACCA: Griffith (K.D.) 3044; Maingay (K.D.) 918; Hervey; Derry 367. PERAK: Ridley 2873. SINGAPORE: Ridley 2872, 2873, 6314, 6468, 6556; Hullett 848.

16. *PSYCHOTRIA ANGULATA*, Korth. in Ned. Kruidk. Arch. II. 243. A shrub 4 to 6 ft. high, glabrous except the inflorescence; young branches pale brown when dry, thinner than a goose-quill, terete. *Leaves* coriaceous, oblanceolate to oblanceolate-elliptic, the apex shortly and rather abruptly acuminate, the base much narrowed; both surfaces brown when dry, tinged with olivaceous; the upper very shining, the broad midrib and nerves depressed; the lower less shining, the midrib

very prominent, and the 8 to 10 pairs of spreading nerves thin but distinct; length 4 to 6 in.; breadth 1 to 1.75 in.; petiole .2 to .5 in., slightly winged near the apex. *Stipules* broadly triangular, acute, sub-acute or bifid, .25 in. long. *Cyme* solitary, terminal, pyramidal, about 1.5 in. long, on a naked peduncle 1.25 to 3 in. long; branches whorled, shortly bracteolate at their bases, spreading; the ultimate branchlets crowded at their ends with numerous sessile flowers .25 in. long. *Calyx* pale, widely cupular, .05 in. long, with irregular small teeth. *Corolla* thick, tubular, its 5 broad lobes with acute inflexed apices; the throat densely sericeous. *Anthers* elliptic, blunt, on short filaments. *Fruit* ovoid or narrowly obovoid, pulpy, obscurely ridged, glabrous, crowned by the small calyx, .5 in. long and half as much broad (unripe). 2-celled. *Seeds* 2, plano-convex. Miq. in Ann. Mus. Lugd. Bat. IV. 210; Hook. fil. Fl. Br. Ind. III. 172. *Psychotria*, Wall. Cat. 8348. *Chasalia perforata*, Miq. Fl. Ind. Bat. Suppl. 546.

MALACCA: Griffith (K.D.) 3037. PROVINCE WELLESLEY: Ridley 7026. JOHORE: Ridley 11161. SINGAPORE: Ridley 2867. PAHANG: Ridley 1353. PENANG: Curtis 14, 726; King's Collector 1683. PERAK: King's Collector 4170.—DISTRIB. Burma.

17. *PSYCHOTRIA HELFERIANA*, Kurz in Journ. As. Soc. Beng., 1872, II. 314. A shrub; the whole plant more or less rusty-pubescent; young branches as thick as a goose-quill or thicker, the pubescence dense and deciduous. *Leaves* thickly membranous, elliptic or oblong-elliptic, rarely obovate-elliptic, the apex acuminate, the base usually cuneate but sometimes rounded; both surfaces dark brown when dry, the lower somewhat tinged with red and less hairy than the upper; the hairs on both adpressed and very numerous on the stout midrib, less so on the 9 to 16 pairs of spreading curved main-nerves; length 6 to 12 in.; breadth 2.5 to 4.5 in.; petioles 1 to 1.75 in. *Stipules* broadly ovate to oblong-lanceolate, often as much as 1 in. long, the apex acuminately bifid. *Flowers* .2 in. long, numerous, mixed with many unequal bracteoles mostly longer than themselves, all acuminate and some of them bifid and crowded in dense pedunculate capitula in a few-branched axillary cyme usually shorter than the leaf-petioles. *Calyx*-tube narrowly campanulate, with 5 lanceolate erect lobes nearly as long as itself, everywhere pilose. *Corolla* similar to the calyx, but smaller and less hairy. *Stamens* almost sessile; anthers broad, blunt. *Fruit* ovoid or ellipsoid, somewhat compressed and boldly 8-ridged, crowned by the lobes of the calyx, .3 in. long and .2 in. in diam. Kurz For. Fl. Burm. II. 11; Hook. fil. Fl. Br. Ind. III. 172.

SINGAPORE: Wallich 8368; Goodenough 184; Maingay (K.D.) 921. MALACCA: Maingay (K.D.) 921; Ridley 184; Lobb. JOHORE: Ridley



11159; King; Hullett 507. PERAK: King's Collector 4345, 4661.  
—DISTRIB. Burma.

VAR. *diffusa*, King & Gamble. *Capitula* in spreading pedunculate panicles several inches in diam.

PERAK: *Scortechini* 400. JOHORE: *Ridley* 3732. SINGAPORE: *Hullett*.

VAR. *angustifolia*, King & Gamble. *Leaves* elliptic-oblong or oblong, not more than 2 in. in width; *capitulum* solitary, sessile.

SINGAPORE: King.—DISTRIB. Andamans.

VAR. *glabra*, King & Gamble. *Leaves* glabrous.

PERAK: *Wray* 1963.

18. *PSYCHOTRIA MONTANA*, Blume Bijdr. 960. A stout glabrous shrub; young branches half as thick as a goose-quill, angled, brown when dry. *Leaves* thinly membranous, on rather long petioles, elliptic or elliptic-oblong, acuminate, the base cuneate; both surfaces greenish or olivaceous-brown when dry, the lower the paler; main-nerves 7 to 8 pairs (rarely 10 pairs) curving upwards, pale and bold like the midrib on the lower surface, faint on the upper; length 5 to 8 in.; breadth 1.75 to 3.5 in.; petioles .4 to 1.25 in., winged near the apex. *Stipules* connate by their short broad bases, the apices caudate-acuminate, curved. *Cymes* terminal, paniculate, on angled peduncles .5 to 1.25 in. in length; branches spreading, angled, bearing numerous shortly pedicelled flowers in cymes of three. *Flowers* .25 in. long. *Calyx* cupular with 5 broad spreading triangular teeth. *Corolla* with subcampanulate tube having a broad band of hairs inside in the upper half; the lobes of the mouth 5, broad, acute, reflexed. *Fruit* ellipsoid-ovoid to ellipsoid, boldly 4-ridged, glabrous, .25 to .3 in. long. *Seeds*: the dorsal surface with a single ridge, the ventral deeply concave, grooved. DC. Prod. IV. 521; Hook. fil. Fl. Br. Ind. III. 174. *P. viridissima*, Kurz in Journ. As. Soc. Beng. 1872, II. 315; For. Fl. Burm. II. 13. *Chasalia montana*, Miq. Fl. Ind. Bat. II. 281. *C. expansa*, var. *montana*, Miq. MS. *Psychotria*, Wall. Cat. 8371, 8378, and *Rubiaceae*, 8339. *Coffea tabaccifolia*, Wall. Cat. 8334.

PERAK: *Scortechini*; *Ridley*, 2922; *King's Collector*, 452, 2190; *Wray* 276.—DISTRIB. Sumatra, *Forbes* 1566, 1862, 2201, 2241, 2330. JAVA: *Blume*; *Forbes* 271, 759, &c. Burma; Assam; Sylhet (*Griffith*, K.D.) 3047.

VAR. *brevipetiolata*, King & Gamble. *Leaves* with petioles .2 to .4 in. long.

PERAK: *Scortechini* 277, 1513; *Wray* 1628, 2289; *King's Collector* 389, 922, 1954, 2190, 4707, 6111, 8596. SELANGOR: *Ridley* 10583. PAHANG: *Ridley* 5831. MALACCA: on Mt. Ophir, *Hullett* 762

19. *PSYCHOTRIA VIRIDIFLORA*, Reinw. ex Blume Bijdr. 965. A small tree or a bush, all parts, except the inflorescence, glabrous; young branches thinner than a goose-quill, dark brown. *Leaves* membranous, oblong-elliptic to oblanceolate-elliptic, shortly and stoutly acuminate, the base much narrowed; both surfaces brown when dry; main-nerves 8 to 14 pairs, curved, spreading, rather faint on both surfaces; length 3.5 to 8 in.; breadth 1.25 to 2.5 in.; petiole .4 to .75 in. occasionally as much as 1.25 in. long. *Stipules* broadly oblong, narrowed to the apex, but not acute, .3 to .5 in. long, deciduous. *Cymes* on naked peduncles (.3 to 1.5 in. long) in broad panicles 1 to 2 in. long and as much wide (more when in fruit); branches divaricating, puberulous, with small broad bracteoles. *Flowers* in small cymes, on the ultimate branches, .1 in. long, on short pedicels, glabrous outside. *Calyx* cupular with irregular, short, sharp teeth. *Corolla* longer than the calyx, widely tubular, with 5 broad sub-acute lobes; the throat sericeous. *Anthers* 5, oblong, blunt, attached by short filaments in the throat. *Fruit* elliptic, with a wide shallow areola on the apex, the sides with 10 bold vertical ridges (2 of them double), glabrous, about .25 in. long and .2 in. in diam. *Seeds* plano-convex, the convexity deeply 5-grooved, the ventral surface flat. *P. sulcata*, Wall. Cat. 8370; Hook. fl. Fl. Br. Ind. III. 168. *P. Jackii*, Hook. fl. Fl. Br. Ind. III. 167.

MALACCA: *Griffith* (K.D.) 3021; *Goodenough* 1878; *Derry* 457, 1224; *Ridley* 1600. PANGKORE: *Curtis* 1369. TRANG: *Wray* 2778. NEGRI SEMBILAN: *Ridley* 1930. SELANGOR: *Ridley* 7434. PERAK: *Scortechini*; *Ridley* 2919, 3067; *Wray* 290, 2027, 2778, 2956; *King's Collector* 2655, 4275, 4374, 5964, 6327, 7224. PENANG: *Wallich* 8343, 8370.—DISTRIB. Burma, *Helper & Griffith* (K.D.) 3040; Sumatra, *Forbes*; Java, *Blume*; Borneo, *Beccari*; *Motley*; *Haviland*.

20. *PSYCHOTRIA BIRCHIANA*, n. sp., King & Gamble. Herbaceous; woody at the base; all parts softly rusty-pubescent; stems 6 to 18 in. high, thinner than a goose-quill, their pubescence crisped, dense, coarse, and entirely or partly deciduous. *Leaves* thickly membranous, elliptic to elliptic-oblong, sometimes sub-obovate, acute, the base rounded or minutely cordate or sometimes cuneate; both surfaces brown when dry, the lower sometimes paler and with fewer hairs; the midrib prominent and very hairy on both sides, the 10 to 12 pairs of rather faint little-curved spreading main-nerves less hairy than the midrib; length 3.5 to 5 in.; breadth 1.5 to 2.25 in.; petiole .5 to 1 in., covered with coarse tomentum mixed with ovate-acuminate scales. *Stipules* oblong-ovate, acuminate, .5 to .75 in. long. *Cymes* pedunculate, solitary, terminal, spreading, 1.5 to 2 in. across, and about as long, the branches spreading, bracteate at the divisions, the bracts lanceolate,

acute, reflexed, .2 or .3 in. long; the peduncle 1.5 to 2.5 in. long, scaly, tomentose; ultimate branches short, bearing at their apices dense capitules of small sub-sessile flowers, mixed with short broad bracteoles. *Flowers* about .1 in. long. *Calyx* cupular-campanulate, pubescent; the mouth wide and with 5 blunt, triangular, spreading lobes. *Corolla* exceeding the calyx, widely tubular, with 5 or 6 short inflexed teeth, glabrous inside, hairy outside. *Anthers* oblong, blunt at each end, the filaments short. *Fruit* ellipsoid, tapering equally to each end, boldly 10-ridged, somewhat compressed, crowned by the hairy calyx-lobes, otherwise sub-glabrous, .25 to .3 in. long and .2 in. across. *Seeds* with 5 dorsal ridges, the ventral surface plane.

PERAK, on Birch's Hill, elev. 4,000 feet: *Scortechini* 258; *Wray* 1; *King's Collector* 2134, 2950, 7348. SELANGOR: *Ridley* 7432.

The flowers are described as white, and the ripe fruit as cherry red. Named in honour of Mr. Birch, a British civil officer, who was murdered by the aborigines in Perak.

21. *PSYCHOTRIA FULVA*, Buch.-Ham. ex. Wall. Cat. 8366, excl. B. A shrub; young branches thinner than a goose-quill, dark brown when dry, bearing a few scattered coarse hairs. *Leaves* thickly membranous, elliptic, shortly acuminate and tapering almost equally to the base; upper surface without hairs except a few on the midrib near the base, under surface with dark cinereous pubescence on the midrib and 15 to 18 pairs of sub-horizontal slightly curved main-nerves; length 5 to 7 in., breadth 1.75 to 3.5 in.; petioles 1.25 to 2.4 in., coarsely and deciduously pubescent. *Stipules* membranous, broadly oblong, the apex deeply and acuminately bifid, the edges coarsely ciliate; length about 1 in. *Cymes* pedunculate, axillary, trichotomous, the flowers in condensed capitular cymes at the ends of the short branches, enveloped when in bud in 2 or 3 large deciduous bracts; in fruit about 2 in. across and less in length; peduncles about 2 in. long; branches about .5 in. long, horizontal; all, like the short flower pedicels, coarsely rusty-pubescent. *Calyx* cupular, with 5 deep, spreading, narrow, acuminate lobes. *Corolla* not seen. *Fruit* narrowly elliptic, somewhat compressed, tapering slightly to each end, the apex crowned by the erect connivent calyx-lobes, boldly but somewhat unequally 12-ridged, glabrous, .45 in. long and .25 in. in diam. *Seeds* 5-ridged on the dorsal, the ventral surface flat. Hook. fil. Fl. Br. Ind. III. 169, excl. syn. *P. monticola*, Kurz. *Psychotria*, Wall. Cat. 8337; Griff. Notulæ, IV. 268; Ic. Pl. Asiat. t. 479, f. 2.

PERAK, On Ulu Batung Padang: *Wray* 1615.—DISTRIB. E. Bengal, *Griffith* (K.D.) 3022, 3034, 3035, 3036; Khasia, *Hook f.* & *Thoms.* 14.

*P. monticola*, Kurz, a Burmese plant, has been reduced to *P. fulva*, Buch.-Ham., but in my opinion it is quite distinct.



22. *PSYCHOTRIA FULVOIDEA*, n. sp., King & Gamble. A small shrub; young branches thinner than a goose-quill, dark-coloured, glabrous. *Leaves* membranous, narrowly elliptic, acuminate, crenulate, the base cuneate; upper surface glabrous, dark brown when dry, the lower reddish-brown; the midrib, nerves and reticulations rusty-pubescent, otherwise glabrous; midrib prominent on both surfaces, the 10 to 14 pairs of spreading, curving main-nerves slightly prominent on the lower; length 6 to 7 in.; breadth 2 to 2.5 in.; petiole 1 to 1.3 in. *Stipules* membranous, ovate, caudate-acuminate, the edges irregularly serrate, ciliate, length about 1 in. *Cymes* axillary, trichotomous, condensed, about 2 in. broad when in fruit and 1.25 in. long, on deflexed, coarsely but shortly pubescent peduncles 3 in. long; their branches short, spreading, bracteate at the divisions and coarsely pubescent. *Flowers* condensed into globose capitulate cymes at the apices of the branches, sessile. *Calyx* narrowly campanulate, pubescent, with 5 erect acute teeth. *Corolla* unknown. *Fruit* narrowly elliptic, tapering to each end, the apex crowned by the short pubescent lobes, with 12 deep ridges and grooves, glabrous, .4 in. long and .2 in. in diam. *Seed* dorsally 5-ridged, ventrally 2-grooved.

PERAK: *Scortechini* 538.

This approaches *P. fulva*, but is a smaller plant, with crenulate leaves quite glabrous on the upper surface and nearly so on the lower.

23. *PSYCHOTRIA STIPULACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 164. A shrub, 1 to 2 feet high, all parts except the inflorescence glabrous; stems as thick as a goose-quill, brown when dry. *Leaves* membranous, broadly oblanceolate to elliptic, or oblong, abruptly and shortly acuminate, much narrowed to the base; both surfaces glabrous, when dry brown with a reddish tinge; midrib very stout, main-nerves 11 to 13 pairs, spreading, slightly curved, distinct on both surfaces; length 5 to 9 in.; breadth 2 to 4 in.; petioles .5 to 1.25 in. long, winged near the apex. *Stipules* large, sub-persistent, ovate, sometimes bifid, .75 to 1 in. long, and about .4 in. broad. *Cyme* usually solitary, corymbose, trichotomous, terminal, on a short peduncle, bracteate at the base, about 2 to 3 in. in diam.; its branches puberulous, bracts and bracteoles triangular. *Flowers* .15 in. long, on short pedicels, clustered in dense, cymose, capituliform cymes at the ends of the ultimate branches. *Calyx* campanulate, with 5 broad pubescent lobes, the tube glabrous. *Corolla* longer\* than the calyx, widely campanulate, 4- or 5-toothed. *Fruit* ellipsoid, sub-compressed, 10-ridged, crowned by the small calyx, .3 in. long, and .15 in. in diam. *Seed* dorsally 5-ridged, ventrally concave, with one central ridge. Wall. Cat. 8329; DC. Prod. IV. 519; Hook. fil. Fl. Br. Ind. III. 167.

PENANG: Wallich 8329; Curtis 732. TRANG: Kunstler 1382.  
PAHANG: Ridley 2216. PERAK: Ridley 2918; King's Collector,  
1357, 1382; Wray 3440; Scortechini 278, 307, 558, 692.—DISTRIB.  
Sumatra.

24. *PSYCHOTRIA CURTISII*, n. sp., King & Gamble. A shrub, 6 feet high; young branches thinner than a goose-quill, rusty-pubescent. *Leaves* elliptic, sometimes somewhat obovate, tapering equally to each end, shortly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper glabrous or with a few hairs on the midrib near the base, the lower rusty-puberulous between the 9 or 10 pairs of bold, shortly and densely rusty-pubescent curved ascending main-nerves; length 5 to 8 in.; breadth 1.5 to 3 in.; petioles .5 in., densely rusty-pubescent. *Stipules* caducous. *Cyme* solitary, terminal, 3-branched, on a pubescent peduncle from .3 to .5 in. long (much longer in fruit), branches bearing 3 to 5 sessile flowers in capitula at their apices; bracteoles linear. *Flowers* .25 in. long, rusty-pubescent. *Calyx* half-superior, campanulate, the mouth with 5 long, spreading, ovate-acuminate lobes. *Corolla* longer than the calyx, salver-shaped, with 5 oblong lobes. *Fruit* ovoid, tapering to the apex, crowned by the long lobes of the calyx, the sides puberulous, 10-ridged. *Seeds* with 4 ridges on the dorsal surface, the ventral plane.

PENANG: Curtis 2695.

25. *PSYCHOTRIA RHINOCEROTIS*, Reinw. ex Blume Bijdr. 961. A shrub; young branches thinner than a goose-quill, at first rusty-tomentose, afterwards glabrescent and pale brown. *Leaves* coriaceous, obovate-oblong or obovate-oblongate, the apex broad, but usually with a small abrupt apiculus, the base cuneate; upper surface olivaceous, glabrous, the lower brown and softly and finely rusty-pubescent; the midrib broad, more prominent on the upper than on the lower surface; main-nerves 10 to 14 pairs, slightly curved, oblique, distinct on both surfaces; length 3 to 5 in.; breadth 1.35 to 2.5 in.; petiole .2 to .6 in., stout. *Panicle* solitary, terminal, 1.5 in. long and slightly wider; branches few, lax, divaricate, cymosely few-flowered. *Fruit* elliptic-ovoid, slightly compressed, with 10 vertical grooves (2 of them double), crowned by the rather broad, bluntly 5-toothed calyx, acutely 10-ridged (2 ridges double), pubescent between the ridges; length .25 in.; breadth .2 in. *Seeds* dorsally 4-ridged, ventral surface plane. Miq. Fl. Ind. Bat. III. 292; DC. Prod. IV. 521; Korth. Kruidk. p. 242.

PERAK: King's Collector 8272; Scortechini.

26. *PSYCHOTRIA MALAYANA*, Jack in Mal. Misc. I. 3; reprinted in Calc. Journ. Nat. Hist. IV. (1843), p. 26. A shrub; young branches

rather thinner than a goose-quill, sub-terete, glabrous, rather pale brown when dry. *Leaves* coriaceous, elliptic or broadly elliptic-lanceolate, shortly and abruptly acuminate, much narrowed to the base; upper surfaces glabrous, brown, shining when dry, the lower dull and sparsely pubescent, often tinged reddish, the edges slightly recurved; main-nerves 12 to 18 pairs, ascending, little curved, bold on the lower surface and faint on the upper; length 5 to 10 in.; breadth 2.5 to 4.5 in.; petioles .4 to 1.5 in. *Stipules* broadly ovate, blunt, about .35 in. long. *Cyme* terminal, on an angled, sub-compressed peduncle .5 to 1 in. long (lengthening in fruit), the branches corymbose, whorled, many-flowered; ultimate cymules 3-flowered. *Flowers* .5 in. long, 2 on each cymule, on short pedicels (the middle one sessile), minutely bracteolate at the base. *Calyx* under .1 in. long, tubular, the truncate mouth minutely 5-toothed. *Corolla* tubular, .4 in. long, with 5 oblong sub-acute lobes; the throat villous inside. *Fruit* .4 in. long and .3 in. in diam., elliptic-ovoid, vertically 10-ridged, the apex with very slight remains of the calyx. *Seeds* faintly 4-ridged on the dorsal, the ventral surface plane with a faint central groove. DC. Prod. IV. 520. *P. aurantiaca*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall., II. 165; Blume Bijdr. 962; Wall. Cat. 8335. *Grumelia aurantiaca* and *Chasalia expansa*, Miq. Fl. Ind. Bat. II. 296 and 281.

SINGAPORE: *Ridley* 6468, 8422; *Hullett* 904. PAHANG: *Ridley* 2197. PERAK: *King's Collector* 6327, 7168; *Wray* 2956; *Scortechini* 307.—DISTRIB. Borneo, Java.

The corolla of this is larger than that of any other Malayan species of *Psychotria*, being about .4 in. long when dry.

#### SPECIES IMPERFECTLY KNOWN.

27. *PSYCHOTRIA WRAYI*, n. sp., King & Gamble. A small shrub, glabrous except the inflorescence; young branches as thick as a swan's-quill, terete, dark-coloured when dry. *Leaves* coriaceous, oblanceolate-elliptic, shortly acuminate, gradually narrowed from about the middle to the short, partially winged petiole; both surfaces dark olivaceous-brown when dry, the midrib rather prominent; main-nerves 13 to 15 pairs, oblique, almost straight, thin but pale and rather distinct on the lower surface, indistinct on the upper; length 6 or 7 in.; breadth 2 to 2.5 in.; petiole about .5 in., winged above. *Stipules* broadly ovate, sub-acute, the edges coarsely ciliate, .5 in. long. *Cymes* terminal, on short peduncles, bracteate at the base, umbelliform, widely spreading, about 4 in. broad and only half as long; the branches 4-angled, sub-compressed, pubescent, divergent. *Flowers* crowded at the extremities of the branchlets, .25 in. long, on short thick pedicels. *Calyx* deeply

cupular, with 5 broad, shallow blunt teeth. *Corolla* much longer than the calyx, widely tubular; lobes 5, blunt, broadly ovate, reflexed, the throat with a little short hair. *Anthers* 5, narrowly elliptic, blunt, on short filaments, almost basifixed, exerted by the reflexion of the lobes of the corolla. *Fruit* unknown.

PERAK: *Wray* 3959; *King's Collector* 2755.

28. *PSYCHOTRIA INÆQUALIS*, n. sp., King & Gamble. A small unbranched shrub; the stem thinner than a goose-quill, deciduously puberulous, only a foot high, brown when dry. *Leaves* thickly membranous, those of a pair somewhat unequal in size, elongate-obovate, the smaller one oblong-elliptic, all abruptly and shortly acuminate, the base cuneate; upper surface glabrous, minutely pitted when dry; the lower with many coarse pale-brown, crisped, flattened hairs on the midrib and nerves, and a few pale appressed hairs on the interspaces; midrib broad and channelled on both surfaces, as are also the 10 to 13 pairs of pale ascending, slightly curved main-nerves; length 6 to 10 in.; breadth 2.5 to 5 in.; petiole .5 to .75 in., stout. *Stipules* narrowly ovate, acuminate, pubescent, .65 in. long. *Cyme* solitary, terminal, 2 to 3.5 in. long (including the 1 to 2 in. peduncle), pyramidal, everywhere rusty-puberulous, the branches opposite, many-flowered, and with broad abruptly acuminate bracts; the lowest pair exceeding 1 in. in length, reflexed; branchlets divaricate. *Flowers* .1 in. long, on short stout pedicels. *Calyx* small, tubular; its lobes broadly triangular. *Corolla* not much longer than the calyx, its lobes linear with moniliform bluish hairs at their bases and on the throat. *Fruit* unknown.

PERAK: *Scortechini* 279.

29. *PSYCHOTRIA CONDENSEA*, n. sp., King & Gamble. A small woody shrub; young branches half as thick as a goose-quill, the nodes close together and slightly thickened, the internodes striate, at first scurfy-puberulous but afterwards glabrous. *Leaves* coriaceous, narrowly elliptic or elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface when dry very dark brown, the lower paler and tinged with olivaceous, the midrib prominent and pale; the 5 or 6 pairs of oblique main-nerves visible beneath but not above; length 1 to 1.25 in.; breadth .3 to .5 in.; petiole .05 in. *Stipules* broadly triangular, acuminate, nearly .1 in. long. *Umbel* cymose, 3-branched, terminal, shorter than the leaves; each branch with 3 unequally pedicellate flowers. *Flowers* not seen. *Fruit* globular-ovoid, with 2 prominent furrowed vertical ridges and several obscure ones between them, crowned by the 5-toothed calyx; length .2 in.; breadth .15 in. *Seeds* with one prominent dorsal ridge, ventral surface flat.

PERAK: *Scortechini*.



## Order LX. VALERIANÆ.

Herbaceous (as regards the Indo-Malayan species). *Leaves* opposite, exstipulate, their bases often connected by an interpetiolar line or ridge; entire, pinnatifid or pinnate. *Flowers* sessile, in cymes, usually hermaphrodite but sometimes polygamous or dicecious, bracteate. *Calyx-tube* adnate to the ovary, the limb in the flower small, in the fruit often enlarged or pappose. *Corolla* superior, gamopetalous, its tube cylindric or gibbous or spurred at the base; the limb with 3 to 5 imbricate lobes, often irregular. *Stamens* 1 to 4, on the tube, usually exerted. *Ovary* inferior with a single perfect, 1-ovuled cell, and 2 barren empty cells; style filiform; stigma 2- or 3-lobed or entire; ovule in the fertile cell pendulous from the apex of the loculus. *Fruit* indehiscent, dry, 1-seeded, the 2 barren cells enlarged or represented by narrow ridges. *Seed* pendulous, with very little or no albumen; embryo straight, radicle superior.—DISTRIB. About 350 species, in temperate climates; generally diffused, but absent from Australia and South Africa.

## VALERIANA, Linn.

Perennial herbs. *Leaves* entire, pinnatifid or pinnate, the radical often undivided and with long petioles. *Flowers* in cymes, corymbosely paniculate; bracts small, oblong or linear, free or nearly so, persistent. *Calyx-limb* in flower obsolete, in fruit developing into a ring of from 5 to 15 feathery bristles, united at their bases into a short funnel-shaped tube. *Corolla-tube* funnel-shaped, its base often sub-gibbous; limb with 5 spreading lobes, both tube and limb pink or white. *Stamens* 3. *Ovary* 3-celled, only 1 cell containing 1 ovule; stigma sub-entire or shortly 3-fid. *Fruit* oblong, plano-convex, with 6 ribs, 1-celled; the 2 barren cells obsolete, crowned by the persistent pappose calyx.—DISTRIB. About 180 species in moist temperate regions.

VALERIANA HARDWICKII, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. I. 166. *Root* fibrous. *Stem* erect, 1 to 3 feet high, pubescent below, mostly glabrous upwards but pilose or barbate at the nodes. *Radical leaves* ovate, acute, on long petioles; *stem leaves* unequally pinnatifid, the segments 3 to 5, the upper the longest, all lanceolate or ovate-lanceolate and irregularly toothed. *Panicles* lax, often as much as a foot long, the branches dichotomous, with small subulate bracteoles at the forks; fruit hairy. Wall. Cat. 432, Pl. As. Rar. 39, t. 263; Don Prod. Fl. Nep. 159; DC. Prod. IV. 640; Clarke in Hook. fil. Fl. Br. Ind. III. 213. *V. Hardwickiana*, Roem. & Schult., Syst. I., Mant. 259. *V. tenera*, Wall. Cat. 435; DC. Mem. Valer. 16; Prod. IV. 640.

*V. elata*, Don Prodr. 159. *V. javanica*, Blume Bijdr. 919. *V. acuminata*, Royle Ill. Him. Bot. 241.

At high elevations on the central ridge in Perak, this is said to occur, but I have seen no specimens.

#### Order LXI. COMPOSITÆ.

Herbs or shrubs, sometimes scandent, rarely trees. *Leaves* alternate, rarely opposite or whorled; simple or sometimes compound exstipulate. *Florets* numerous, small, aggregated in centripetal heads, sessile on the dilated top of the peduncle (receptacle); the heads surrounded by an involucre of 1- or more-seriate, free or connate bracts; bracteoles none or reduced to paleate scales or bristles on the receptacle; individual florets all tubular (head discoid), or the outer or all ligulate (head rayed); all bi-sexual or the inner bi-sexual or male, the outer female or neuter; sometimes dioecious. *Sepals* connate in a calyx-tube, adnate to the ovary; limb none, or composed of hairs (pappus) or scales. *Petals* connate in a corolla of two forms: (a) tubular or campanulate, with 4-5-lobed limb; lobes valvate with marginal nerves; (b) ligulate with lobes elongated and connate in a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4-5, inserted within the corolla-tube; filaments usually free; anthers basifixed, usually connate (syngenesious); connective produced upwards; cells simple or tailed at the base; pollen sub-globose, rough. *Pistil* an inferior 1-celled ovary; ovule solitary, basal, erect, anatropous, nucleus with one coat; style slender, normally 2-fid; the arms (sometimes) connate, linear or sub-terete, naked or pubescent externally or tipped by pubescent cones; the margins stigmatic. *Fruit* a dry indehiscent achene (cypsela). *Seed* erect; testa membranous; albumen none; embryo straight; cotyledons plano-convex; radicle short.—DISTRIB. Universal; genera about 1,000; species about 8,000.

Corollas of all the florets either tubular to near the mouth or the marginal row ligulate; style-arms long, distinct, or very short, or the style sub-entire in the sterile florets of heads with heterogamous florets; stems sometimes woody; leaves alternate or opposite; sap never milky:—

Florets red, purple, or white, never yellow; all similar (homogamous) and tubular, or rarely (*Elephantopus*) cleft laterally; involucre of bracts always more than 1-seriate; pappus present, usually setaceous, receptacle naked or rarely (*Ageratum*) paleaceous:—

Anthers cleft at the base and appendiculate at the apex; style-arms subulate, hairy; leaves alternate (*Vernoniae*):—

Heads distinct, many-flowered; pappus long, copious, cypselas ribbed .. .. . 1. *VERNONIA*.

- Heads 1- or few-flowered, crowded into dense clusters resembling single heads; pappus chaffy .. .. 2. ELEPHANTOPUS.
- Anthers sub-entire at the base, either truncate or appendiculate at the apex; leaves opposite at any rate below (*Eupatorieæ*):—
- Anthers truncate at the apex .. .. 3. ADENOSTEMMA.
- Anthers appendiculate at the apex:—
- Pappus paleaceous, receptacle sometimes paleaceous .. 4. AGERATUM.
- Pappus of slender hairs; receptacle always naked; bracts of involucre 4 with sometimes a small outer one; scandent .. .. 5. MIKANIA.
- Florets, if homogamous and tubular, yellow; if heterogamous, at least those of the disk yellow; or if none of the florets yellow (*Emilia*) then with the bracts of the involucre 1-seriate
- Anthers appendiculate at the apex (*Asteroidæ*):—
- Receptacle naked, smooth, or pitted; sometimes, when pitted, the edge of the pit fimbriate:—
- Bracts of involucre in two rows:—
- Anthers sub-entire at the base; florets all tubular, those of the disk purple, of the ray filiform, yellowish or white; pappus none or of 2 bristles; heads small in lax panicle cymes, bracts of involucre in two series; erect herbs .. .. 6. DICHROCEPHALA.
- Bracts of the involucre many-seriate, leaves alternate:—
- Anthers obtuse and entire at the base; florets of disk tubular with wide limb; those of the ray filiform-tubular or tubular only at the base, expanding into small yellowish ligules; pappus copious and silky; heads in dense corymbose panicles; climbers .. 7. MICROGLOSSA.
- Anthers cleft at the base; style-arms of hermaphrodite flower filiform, linear, or obtuse, or those of the sterile flowers undivided (*Inuloideæ*):—
- Flower-heads medium-sized; separate, solitary, or in corymbose or paniculate cymes, not in globose clusters, if clustered the cypselas with copious soft pappus:—
- Herbs; bracts of involucre narrow; flowers not corymbose:—
- Anther-cells tailed at the base, the tails of adjacent anthers confluent .. .. 8. BLUMEA.
- Anther-cells sagittate at the base, not tailed or connate .. .. 9. LAGGERA.
- Shrubs; bracts of involucre broad; flowers corymbose .. .. 10. PLUCHEA.
- Flower-heads small, clustered in dense ovoid or globose masses; herbs with winged stems; pappus none .. .. 11. SPILERANTHUS.
- Bracts of the involucre 1-seriate, sub-equal, free or united, with sometimes a few short outer bractlets

(calyculus) at their bases; heads homogamous; anther-cells sub-entire at the base; receptacle naked (*Senecionidae*):—

Leaves alternate; pappus of fine hairs, style-arms of hermaphrodite flowers truncate or obtuse, penicillate or with a hairy tip:—

Heads ebracteate; florets purple .. .. 12. *EMILIA*.

Heads bracteolate; florets yellow .. .. 13. *GYNURA*.

Receptacles paleaceous; anthers sub-entire at the base; bracts of involucre 1- to many-seriate; heads usually radiate, heterogamous; style-arms truncate or appendiculate, or those of the sterile florets entire; pappus of 2 to 4 arms or paleaceous or absent; leaves at the base of the stem usually opposite, those higher up opposite or alternate (*Helianthoideae*):—

Pappus of only 4 bristly awns, or cup-like or absent:—

Cypselas all thick, or those of the ray-florets 3-angled and those of the disc laterally compressed; pappus cup-like or composed of 2 to 3 stiff chaffy or bristly arms, with or without intermediate smaller scales or altogether absent; leaves usually opposite:—

Inner bracts of the involucre embracing and enclosing the cypselas of the fertile ray-florets; pappus absent, outer bracts of involucre 5, glandular .. .. 14. *SIEGESBECKIA*.

Inner bracts of the involucre all flat, scales of receptacle flat, very narrow, usually few; disk-florets 4-5-fid, ligules small; pappus absent, or if present shortly 2-awned; outer bracts of involucre numerous .. .. 15. *ECLIPTA*.

Scales of the receptacle concave or complicated more or less enclosing and embracing the disk florets:—

Cypselas not winged, compressed or 3-5-angled, ray-florets yellow with large ligules; disk-cypselas with 1 or 2 short deciduous awns; leaves all opposite .. .. 16. *WEDELIA*.

Cypselas of the disk-florets ciliate, winged on the margins, laterally compressed; heads small; leaves always opposite .. .. 17. *SPILANTHES*.

Cypselas more or less depressed from the top; pappus of 2 (rarely 3 or 4) bristles or absent:—

Outer bracts of the involucre almost equal; herbaceous; inner bracts separate, almost resembling the scales of the receptacle; ray-florets fertile; leaves opposite:—

Cypselas flat, their margins lacerate and winged; pappus composed of bristles .. .. 18. *SYNEDRELLA*.

Outer bracts of the involucre few, small; inner bracts connate below, membranous:—



Cypselas not beaked; leaves opposite, simple to pinnatisect .. .. . 19. *BIDENS*.

Pappus of membranous scales; heads radiate; leaves opposite:—

Scales of pappus feathery, fringed; heads medium-sized .. .. . 20. *TRIDAX*.

Anthers inappendiculate at the apex; receptacle (in our species) not paleaceous; pappus absent or reduced to a raised rim, rarely scaly and short; leaves usually alternate (*Anthemideae*):—

Flower-heads discoid, heterogamous; pappus absent:—

Florets of the circumference very numerous; cypselas flat or concave at the top; flower-heads globose or hemispheric, sub-sessile; bracts of involucre in 2 series, spreading in fruit .. .. . 21. *CENTIPEDA*.

Florets of the circumference few; heads very small, in racemes or panicles; cypselas ellipsoid or obovoid, rounded at the apex .. .. . 22. *ARTEMISIA*.

Corollas of all the florets flatly expanded from a tubular base, ligulate, their apices 5-toothed; leaves radical or cauline and alternate, never opposite; stem always herbaceous, fistulose; sap milky (*Cichorieae*):—

Pappus of simple hair-like bristles, at least in the central florets; florets yellow, cypselas fusiform or oblong, with glabrous or puberulous ribs .. .. . 23. *CREPIS*.

NOTE.—The above key is taken mainly from “Bengal Plants,” by Lieut.-Col. D. Prain, F.R.S., Superintendent, Royal Botanic Garden, Calcutta.

### 1. *VERNONIA*, Schreb.

Herbs, shrubs, climbers or small trees. *Leaves* alternate, pinninerved, entire or dentate. *Heads* axillary or terminal, solitary or in cymes or panicles, homogamous; flowers often few, but very rarely solitary. *Involucre* ovoid, globose or hemispheric, as long as or shorter than the flowers; bracts in many series, the inner longest. *Receptacle* naked or pitted, sometimes with short hairs. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anther-bases* obtuse, sagittate. *Style-arms* subulate, acute, hairy. *Cypselas* striate, ribbed or angled, rarely terete, truncate at the apex; pappus of many hairs, usually in two rows, the inner hairs thin and slender, the outer sometimes stout and compressed, persistent or deciduous.—*DISTRIB.* About 500 species, mostly American.

A large shrub or small tree; leaves sub-coriaceous; involucre bracts obtuse .. .. . 1. *V. arborea*.

Herbaceous annuals; leaves membranous; involucre bracts acuminate:—

Heads few, 35 in. in diam., in long-peduncled cymes.. .. . 2. *V. chinensis*.

Heads numerous, .2 to .25 in. in diam., in loose terminal corymbose cymes .. .. 3. *V. cinerea*.

1. *VERNONIA ARBOREA*, Buch.-Ham. in Trans. Linn. Soc. XIV. 218. A tree, 30 to 60 feet high; young branches as thick as a goose-quill or thinner, at first covered, like the under surfaces of the leaves and branches of the inflorescence, with short rusty tomentum, sometimes glabrous or glabrescent. *Leaves* sub-coriaceous, entire, elliptic ovate or ovate-oblong, acute or shortly acuminate, the base rounded or cuneate; upper surface glabrous, or nearly so, except the midrib, the reticulations minute and distinct; main-nerves 8 to 14 pairs, spreading, interarching, bold and distinct on the lower surface, more faint on the upper; length 3.5 to 6 in.; breadth 1.75 to 2.75 in.; petioles .75 to 1.25 in., pubescent. *Heads* 2- to 5-flowered, collected in large open terminal panicles much longer than the leaves. *Involucral bracts* few, small, oblong, obtuse, less than half as long as the flowers, pubescent, concave, persistent. *Corolla* glabrous, bluish. *Cypselas* not conspicuously ribbed, short, truncate; pappus in a single row, tuberculate, white tinged with ochraceous, persistent. DC. Prod. V. 22; Kurz For. Fl. Burm. II. 80; Clarke Comp. Ind. 23; Hook. fil. Fl. Br. Ind. III. 239. *Vernonia javanica*, *Blumeana* and *celebica*, DC. l.c. 21, 22; Miq. Fl. Ind. Bat. II. 9, 10. *Eupatorium celebicum* and *javanicum*, Blume Bijdr. 903. *Conyza acuminata* and *arboorea*, Wall. Cat. 3034A and 3074.

MALACCA: Griffith. SINGAPORE: Lobö; Ridley 2735, 2739, 9478; Maingay (K.D.) 948, 949, 950. PENANG: Curtis 2, 926. NEGRİ SEMBILAN: Ridley 10087. SELANGOR: Ridley. PERAK: Wray 2240, 2442; King's Collector, many Numbers; Scortechini.—DISTRIB. Ceylon, Malay Archipelago, Philippines, China.

2. *VERNONIA CHINENSIS*, Less. in Linnæa, VI. 674. An erect annual with divaricate, softly puberulous to tomentose, angled branches. *Leaves* alternate, sessile or petiolate, membranous, ovate elliptic elliptic-lanceolate or oblanceolate, narrowed at the base, sub-serrate or entire. *Heads* few, .35 in. in diam., in lax, few-branched, axillary and terminal, open puberulous cymes, on slender peduncles longer than the leaves, 15- to 30-flowered. *Involucral bracts* not numerous, lanceolate, awned or acute, usually at first pubescent outside, inside glabrous, shining, 1-nerved; longer than the glabrous or glabrescent corollas. *Cypselas* less than 1 in. long, 4- or 5-ribbed, glabrous. *Pappus* scanty, white. Clarke Comp. Ind. 78; Hook. fil. Fl. Br. Ind. III. 235. *V. albicans*, DC. in Wight Contrib. 6; Prod. V. 26 (in part). *Cyanopis pubescens* and *C. villosa*, DC. Prod. V. 69. *Conyza chinensis*, Lamk. Dict. II. 83 (not of Linn.). *C. punctulata*, Wall. Cat. 2995. *Eupatorium menthaefolium*, Wall. Cat. *Cynanthillium villosum* and *C. pubescens*, Blume

Bijdr. 889 and 890. *Centratherum chinense*, Less. in Linnæa (1829) 320. *Synanthera*, Wall. Cat. 7136.

PENANG: J. Scott; Curtis 931; King; Deschamps; MALACCA: Cuming; Griffith; Hullett 634. SINGAPORE: King.—DISTRIB. Malay Archipelago, Philippines.

3. *VERNONIA CINEREA*, Less. in Linnæa, IV. 291, and VI. 673. Herbaceous, erect, 6 to 18 in. high, with more or less minute whitish pubescence everywhere; stems slender, striate. *Leaves* membranous with variable petioles, ovate or lanceolate, sometimes obovate or oblanceolate, the apex obtuse or acute, the edges obtusely or acutely toothed, the base narrowed, both surfaces olivaceous-cinereous when dry, the upper glabrous or nearly so, the lower more or less cinereous-pubescent; length 1·5 to 3 in.; breadth ·3 to ·5 in.; petiole ·1 to ·5 in. (in the lower leaves). *Heads* ·2 to ·25 in. in diam., on 10- to 20-flowered, loose, terminal, long-peduncled, corymbose cymes with divaricate branches; bracts of peduncle very few. *Involucral scales* linear-lanceolate, acuminate or almost awned, shorter than the florets, 1-nerved, ·1 in. long, densely pubescent. *Corolla* pubescent, the tube very narrow lavender. *Cypselas* minute; pappus copious, dirty white, the outer row very short. DC. Prod. V. 24, in Wight Contrib. 6; Wall. Cat. 3008; Hook. fil. Fl. Br. Ind. III. 234; Miq. Fl. Ind. Bat. II. 11; Prain Bengal Plants, 590. *V. conyzoides*, DC. in Wight Contrib. 6; Prod. V. 25. *V. rhomboidea* and *V. montana*, Edgew. in Trans. Linn. Soc. XX. 62. *V. albicans*, DC. in Wight Contrib. 6 (*in part*); Wight Ic. 1076. *V. abbreviata* and *leptophylla*, DC. l.c. 25. *V. laxiflora*, Less. in Linnæa, VI. 646; DC. l.c. 25. *V. physalifolia*, DC. in Wight Contrib. 6; Prod. Fl. Pen. Ind. Or. 24. *V. parviflora*, *linifolia*, and *fasciculata*, Reinw. in Bl. Bijdr. 893. *V. Zollingeriana*, Schultz-Bip. in Miq. Fl. Ind. Bat. II. 16. *V. cyanonioides*, Walp. in Linnæa XIV. 509. *Conyza abbreviata*, Wall. Cat. 3048; *C. bellidifolia*, id. 3047; *cinerascens*, 3062; *incana*, 3046; *linifolia*, 3063; *elegantula*, 3049; *ovata*, 3097, and *sub-simplex*, 3003. *C. cinerea*, Linn. Sp. Pl. 862; Wall. Cat. 3008. *C. prolifera* and *C. heterophylla*, Lam. Encyl. II. 84. *Serratula cinerea*, Roxb. Hort. Beng. 60. *Chrysocoma purpurea*, Forst. Prod. 54. *C. violacea*, Schum. Pl. Guin. 384. *Cyanopsis decurrens*, Zoll.

In all the provinces, in waste places near cultivation.—DISTRIB. All tropical countries.

## 2. ELEPHANTOPUS, Linn.

Perennial rigid herbs. *Leaves* alternate, sessile, penninerved, entire or dentate, mostly radical. *Heads* homogamous, each containing 1 to 5



flowers, and collected into ovoid or globose clusters, surrounded by several large leafy bracts. *Involucre-proper* compressed, its component bracts oblong, acute, about 8, dry, stiff, unequal, alternately flat and conduplicate; receptacle naked. *Flowers* all equally 4-lobed, and cleft on one side, and with the lobes spreading in a somewhat palmate manner. *Anthers* obtusely sagittate at the base. *Style-arms* subulate. *Cypselas* truncate, 10-ribbed; bristles of pappus few, rigid, shining, slender and dilated below or chaffy.—*DISTRIB.* 10 or 12 species, chiefly tropical American—one cosmopolitan.

*ELEPHANTOPUS SCABER*, Linn. Sp. Pl., 814. Stems dichotomous, from a few inches to 2 feet high, terete, finely strigose. *Leaves* membranous, the radical ones obovate, oblong to elliptic-oblong, tapering to the short petiole, the edges dentate or crenate, up to 6 in. in length and 1.25 to 2.5 in. broad; the cauline few, smaller, sessile, both sets scabrid on the upper surface and finely strigose on the lower; main-nerves 6 to 8 pairs in the cauline, more numerous in the radical leaves, all slightly prominent on the lower surface. *Collective heads* hemispheric, .5 to .75 in. in diam., solitary, terminal, on long peduncles. *Bracts* of the conjoined heads 3, leaf-like, about .5 in. broad, broadly ovate or reniform, apiculate, nervose and pubescent behind; bracts of the involucre-proper shining, glabrous; pappus of 5 shining tuberculate bristles, dilated at the base. Wall. Cat. 2979; DC. Prod. V. 86; Roxb. Fl. Ind. III. 445; Don Prod. 169; Wight Ic. 1086; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 590.

In all the provinces, in cultivated places.—*DISTRIB.* In most tropical countries.

### 3. ADENOSTEMMA, Forst.

Herbs, glandular-pubescent or glabrous. *Leaves* mostly opposite, petiolate. *Heads* homogamous, in lax corymbose cymes; involucre campanulate; its bracts numerous, sub-2-seriate, narrow, herbaceous, sometimes connate; receptacle flat, naked. *Corollas* all equal, tubular, regular, with short tube and campanulate 5-toothed limb. *Anthers* truncate, with glandular apiculus, their bases obtuse. *Style-arms* elongate, dilated near the apex. *Cypselas* obtuse, 5-ribbed, glandular; pappus of 3 to 5 short rigid, often clavate hairs, joined at their bases by a narrow ring.—*DISTRIB.* Species 5 or 6 American, 1 cosmopolitan.

*ADENOSTEMMA VISCOSUM*, Forst. Char. Gen. 20. An erect, rarely decumbent annual, slender or robust, glabrous; pubescent or viscidly pubescent. *Leaves* membranous, sessile or petiolate, opposite or the upper alternate, from linear to broadly ovate, acute sub-acute cuneate or cordate at the base, the edges serrate crenate or entire, the upper surface usually smooth but sometimes rugose; length from 2 to 6 in.;

petioles varying in length. *Heads* 3 to 4 in. in diam., in lax corymbose, pedunculate cymes. *Involucral bracts* oblong, obtuse or acute, glabrous, glandular or scabrid. *Corollas* white, pubescent near the mouth, styles much exserted, the arms clavate. *Cypselas* usually warted, crowned by a glandular ring, bearing pedicellate lobed glands. DC. Prod. V. 111; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 591.

In all the provinces, but not abundant in any of them.—DISTRIB. The tropics generally.

In the Flora of British India, III. 242, Sir Joseph Hooker recognises seven varieties of this widely distributed and variable species. And to one or other of these he reduces the following eleven species of De Candolle: *A. fastigiatum*, DC. Prod. V. 111, *A. leiocarpum*, *A. Roylei*, *A. elatum*, *A. latifolium*, l.c. p. 112, *A. macrophyllum*, *A. parviflorum*, *A. reticulatum*, *A. viscosum*, *A. madurense*, *A. erectum*, l.c. p. 113. He also reduces here the following: *Ageratum aquaticum*, Roxb. Fl. Ind. III. 415; *A. strictum*, Bot. Mag. t. 2410; *Lavenia fastigiata*, *macrophylla* and *parviflora*, Blume Bijdr. pp. 905 and 906; and the following Nos. of the Wallichian Catalogue, viz., *Lavenia erecta*, 3218; *carnosa*, 3219; *alba*, 3220; *rugosa*, 3221; *viscida*, 3222.

#### 4. AGERATUM, Linn.

Erect herbs. *Leaves* opposite in the lower part of the stem, alternate in the upper. *Heads* in panicles or corymbs, homogamous. *Involucre* narrowly campanulate; its bracts in 2 or 3 series, linear, subequal; receptacle convex, naked or with deciduous scales. *Corollas* all tubular, equal, regular, the limb 5-cleft. *Anthers* with slight apical appendages, their bases obtuse. *Style-arms* elongate, obtuse. *Cypselas* 5-angled; pappus of 5 short, free or connate scales, or of 10 to 20 narrow, unequal scales.—DISTRIB. About 20 species, all probably American, several introduced in the Tropics of the Old World.

AGERATUM CONYZOIDES, Linn. Sp. Pl. 839. Annual, 1 to 2 feet high, everywhere with sparse white, rather soft pubescence. *Leaves* membranous, ovate, sub-acute, the base broad and sub-truncate, sometimes cuneate; the edges coarsely crenate or dentate; both surfaces greenish when dry, the upper sparsely hispid; the lower glabrous, boldly reticulate; main-nerves about 2 or 3 pairs, ascending, curved, the lower one branching; length 1 to 3.5 in. *Heads* .25 in. in diam., in terminal or axillary corymbose cymes. *Involucral bracts* shorter than the flowers, narrowly lanceolate, acute, 3-nerved, puberulous. *Corollas* pale blue or white. *Cypselas* black; pappus of 5 shining, spreading scales, with broad, often serrate bases. DC. Prod. V. 108; Clarke Comp. Ind. 30; Wall. Cat. 3176; Hook. fil. Fl. Br. Ind. III. 243; Prain Bengal Plants, 591. *A. cordifolium*, Roxb. Fl. Ind. III. 415; Wall. Cat. 3177.

In all the provinces, in cultivated places.—DISTRIB. The tropics generally.

#### 5. MIKANIA, Willd.

A twining herb (in Indo-Malaya). *Leaves* opposite, petiolate. *Heads* small, in spikes racemes or panicles, homogamous, usually 4-flowered. *Involucre* oblong, its bracts 4, narrow, sometimes with a small outer one; receptacle small, naked. *Corollas* all equal, regular, tubular, the tube narrow; the limb campanulate, 5-fid. *Anthers* appendiculate, the base obtuse. *Style-arms* long, acute. *Cypselas* with truncate apices, 5-angled; pappus with one or more rows of scabrid hairs, often connate at the base.—DISTRIB. About 60 species, all in the warm parts of America and Africa except the following.

*MIKANIA SCANDENS*, Willd. Sp. Pl. 1743. A glabrous or puberulous climber; young branches less than half as thick as a goose-quill, brown and striate when dry. *Leaves* membranous, on long petioles, ovate, acuminate; the base broad, cordate, often almost sagittate, the edges sinuate; main-nerves a single pair, ascending from the base and branching outwards; length 1 to 2 in.; breadth .6 to 1.25 in.; petioles .5 to 1 in., slender. *Heads* narrow, 4-flowered, in lax corymbose cymes, on slender peduncles much longer than the leaves, peduncles and branches angled when dry, puberulous. *Scales of involucre* chaffy, narrowly oblong, obtuse. *Cypselas* glabrous; pappus reddish. DC. Prod. V. 199; Clarke Comp. Ind. 34; Hook. fil. Fl. Br. Ind. III. 244; Prain Bengal Plants, 592. *M. volubilis* and *M. chenopodifolia*, Willd. l.c. 1745; DC. l.c. 199 and 201. *Eupatorium scandens*, Linn.; Jacq. Ic. t. 169.

In all the provinces, common.—DISTRIB. British India, Malay Archipelago, Tropical Africa.

#### 6. DICHROCEPHALA, DC.

Annuals, with alternate toothed lyrate or pinnatifid leaves. *Heads* small, heterogamous, globose or hemispheric, not rayed, in panicles; *Outer florets* ♀, in many rows, slender, fertile, rigid, 2-3-toothed or cleft. *Disk-florets* ♂, fertile, narrow, 4- or 5-toothed. *Anthers* with truncate bases. *Style-arms* of ♂ florets short, flattened, the tips lanceolate; pappus none or (in the ♂) of 2 minute bristles.—DISTRIB. Species 5, Asiatic and African.

*DICHROCEPHALA LATIFOLIA*, DC. in Guill. Archiv. Bot. II. 518. An annual weed, 12 to 24 in. high, erect or spreading, glabrous pubescent or villous. *Leaves* very variable, ovate lanceolate or obovate, entire pinnatifid or lyrate, with the terminal lobe broadly ovate and coarsely



toothed; length 1 to 4 in.; petioles .25 to 1.25 in. *Heads* about .15 in. in diam., globose, on pedicels many times longer than themselves, in lax, few-branched, cymose panicles. *Ray-florets* ♀, filiform, obscurely 2-3-toothed, white. *Disk-florets* ♂, 4-cleft, yellow. *Cypselas* very small, smooth, with a callous margin, and often with 2 small bristles. DC. in Wight Contrib. 11, Prod. V. 372; Wight Ic. 1096; Clarke Comp. Ind. 36; Hook. fil. Fl. Br. Ind. III. 245. *D. gracilis* and *D. sonchifolia*, DC. l.c. 371, 372. *Cotula sinapifolia*, Roxb. Hort. Beng. 63, Fl. Ind. III. 437; Wall. Cat. 3237. *C. bicolor*, Roth Cat. Bot. II. 116. *C. latifolia*, Pers. Syn. II. 464. *Grangea latifolia*, Lam. Ill. t. 699. *Hippia bicolor*, Smith in Rees Cyclop. XVIII. *Ethulia integrifolia*, Don Prodr. 182.

PERAK: *Scortechini*.—DISTRIB. British India, tropical and sub-tropical Asia and Africa.

#### 7. MICROGLOSSA, DC.

Slender shrubs, often scandent. *Leaves* alternate, entire. *Heads* small, heterogamous, collected in large corymbose panicles. *Ray-florets* ♀, in 1 or more series, fertile, the ligule minute, white. *Disk-florets* few or many, ♂, fertile, tubular, with dilated 3- to 4-fid limb. *Involucre* campanulate, composed of several series of narrow bracts, the outer shorter. *Receptacle* flat, naked or nearly so. *Corolla*, the ligulate or ray ones narrow, about as long as the style; those of the disk (the tubular) longer. *Anthers* with obtuse bases, entire. *Style-arms* of the ♂ flattened; their tips long, lanceolate. *Cypselas* angled; pappus hairs numerous, slender, silky, in one or two series, somewhat unequal.—DISTRIB. About 6 species, Asiatic and African.

MICROGLOSSA VOLUBILIS, DC. Prod. V. 320. A sub-scandent shrub; branches half as thick as a goose-quill, ridged, glabrous. *Leaves* membranous, ovate-lanceolate, acuminate, the base cuneate or rounded, the edges obscurely toothed; both surfaces brown when dry, glabrous, the lower sometimes slightly pubescent; main-nerves 4 or 5 pairs, little curved, ascending, prominent beneath; length 1.5 to 2 in.; breadth .65 to 1.25 in.; petioles .25 to .4 in., slender. *Heads* .35 in. in diam., on short peduncles, crowded in dense corymbose terminal cymes, much longer than the leaves. *Cypselas* compressed, 4-angled, puberulous; pappus copious, reddish, much longer than the minute achenes. Clarke Comp. Ind. 57; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 257. *Conyza volubilis*, Wall. Cat. 3057. *Erigeron pyriformis*, Benth. Fl. Hongk., 176.

PERAK: *Ridley* 2890; *Wray* 2472. PENANG: *Wallich* 3057. —DISTRIB. British India, Burma, Malay Archipelago, China.

## 8. BLUMEA, DC.

Herbs, annual or perennial, glandular-pubescent or woolly. *Leaves* alternate, rarely entire, usually lobed or toothed. *Heads* in paniculate cymes, rarely in racemes, heterogamous, disciform, yellow or purplish. *Ray-florets* in several series, ♀, fertile, filiform, 2- or 3-toothed. *Disk-florets* ♂, few, fertile, with slender tube and 5-toothed limb. *Involucre* ovoid or campanulate; its bracts in several rows, narrow, acute, herbaceous, the outer smaller; receptacle flat, naked. *Anthers* with sagittate bases produced into small slender tails. *Style-arms* of the hermaphrodite flower flattened or filiform, rarely connate with the nearest anthers. *Cypselas* small, sub-terete or angular, with or without ridges; pappus hairs in a single row, slender, often caducous. —DISTRIB. About 60 species, in tropical and sub-tropical Asia, Africa, and Australia.

- |   |                            |
|---|----------------------------|
| Scandent; pappus white .. .. .  | 1. <i>B. chinensis</i> .   |
| Large shrub; pappus red .. .. .   | 2. <i>B. balsamifera</i> . |
| Erect herbs; pappus white:—   |                            |
| Heads in small sessile clusters of 2 or 3 in the axils of small bracts on an elongated pseudo-spike .. .. .   | 3. <i>B. glomerata</i> .   |
| Heads few (1 to 6), in short, axillary, condensed, pedunculate cymes; leaves oblanceolate or obovate, dentate but not lobed; flowers purple .. .. .                             | 4. <i>B. Wightiana</i> .   |
| Heads sessile or sub-sessile, in lax, shortly-branched, leafy cymose panicles; leaves oblanceolate, dentate but not lobed; flowers yellow .. .. .                               | 5. <i>B. lacera</i> .      |
| Heads sessile or sub-sessile, in axillary spikes several inches long, arranged in a pseudo-panicle; leaves oblanceolate, dentate and sometimes lobulate; flowers yellow .. .. . | 6. <i>B. membranacea</i> . |

1. *BLUMEA CHINENSIS*, DC. Prod. V. 444. Scandent; young branches half as thick as a goose-quill, glabrous, much striate and dark brown when dry. *Leaves* membranous, elliptic or oblong-elliptic, acuminate or acute, narrowed to the rounded base, the edges with remote, narrow, small sharp teeth, or sub-entire; both surfaces glabrous, the upper dark-brown and shining, the lower paler and tinged olivaceous; main-nerves 4 or 5 pairs, curved, ascending, thin but distinct on the lower surface, faint on the upper; length 2.25 to 3.25 in.; breadth .85 to 1.4 in.; petiole .2 to .3 in. *Heads* .35 in. across, sessile, in small pedunculate axillary cymes, 3 in. long, diminishing upwards to .75 in. in length; the peduncles and their branches everywhere pubescent, sometimes a small cyme with 2 to 4 heads in the same axil as a longer one. *Involucral bracts* of the outer two series short, ovate-lanceolate, blunt, densely pubescent, those of the inner two twice as long

(or more), linear-lanceolate, acuminate, puberulous or almost glabrous, 1-nerved, longer than the copious white pappus; corolla-lobes hairy; receptacle and *cypselas* silky, white. Hook. fil. Fl. Br. Ind. III. 268. *Conyza chinensis*, Linn. Sp. Pl. 862; Blume Bijdr. 898. *B. longispina*, Zoll. et Morr. Syst. Verz. 121. *C. serici-vestita*, Wall. Cat. 2996a. *Baccharis nitida*, Wall. Cat. 3043.

PENANG: Curtis 2324; Wallich 2996, 3043. SINGAPORE: Ridley 2744. PERAK: Scortechini 1471.

VAR. *riparia*, King & Gamble. Young leaves and stems somewhat hairy; main-nerves of leaves 3 to 4 pairs, depressed on the upper surface. *Blumea riparia*, DC. Prod. V. 444; Clarke Comp. Ind. 85. *Conyza riparia*, Blume Bijdr. 899.

PERAK: King's Collector 1214; Scortechini.—DISTRIB. Java, Borneo.

2. *BLUMEA BALSAMIFERA*, DC. Prod. V. 466. A shrub, 6 to 12 feet high; young branches nearly as thick as a goose-quill, tomentose, striate. Leaves thickly membranous or sub-coriaceous, elliptic-lanceolate, coarsely and unequally serrate dentate or sub-entire, acute or sub-acute, narrowed at the base; upper surface dark olivaceous-green, minutely tomentose or strigose, the lower surface with dense silky cinereous-yellowish tomentum; main-nerves 7 to 10 pairs, curved, ascending, faint on both surfaces, but especially on the lower; length 2 to 3 in.; breadth .75 to 1.5 in.; petioles .2 to .75 in. long, the longer ones often with lateral auricles; in the lower part of the branches the leaves often much larger. Heads sub-cylindric, sessile, or on short pedicels, arranged in large, lax, and spreading or dense, often leafy, corymbose or panicle, axillary and terminal tawny-tomentose cymes. Involucral bracts linear, acuminate, densely tomentose; hermaphrodite florets very numerous in the centre, narrowly tubular; receptacle naked. *Cypselas* 10-ribbed, silky; pappus copious, red. Clarke Comp. Ind. 89; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 270; Prain Bengal Plants, 598. *Conyza balsamifera*, Linn. Sp. Pl. ed. II. 1208; Wall. Cat. 2998; Roxb. Fl. Ind. III. 427. *C. vestita*, Wall. Cat. 2998. *C. appendiculata* Blume Bijdr. 895 (not of Lam.).

MALACCA: Griffith (K.D.) 3143; Hervey. PENANG: Walker 160; Scott; Curtis 29. PERAK: Scortechini; King's Collector 6343; Wray 1741. SINGAPORE: G. Thomson; Hullett 372; Ridley 2742. JOHORE: King.—DISTRIB. British India, Malay Archipelago.

VAR. *angustifolia*, King & Gamble. Leaves narrowly oblong, acute at both ends, less than .5 in. broad.

SINGAPORE: Ridley 2742.

3. *BLUMEA GLOMERATA*, DC. in Wight Contrib. 15. An erect

herb, about 18 to 24 in. high; stem at the base nearly as thick as a goose-quill, sparsely sub-glandular-pubescent, the hairs spreading. *Leaves* membranous, olivaceous, sparsely strigose on both surfaces, the hairs on the upper surface with bulbous bases; the lower sessile, lyrate-ly lobed, the lobes dentate, the apex acute; the upper leaves much smaller, lanceolate, dentate. *Heads* from .2 to .25 in. in diam., in small sessile clusters of 2 or 3, all in the axils of small leaf-like bracts along the long slender branches, forming a pseudo-spike. *Involucral bracts* narrowly linear, pubescent, 1-nerved; receptacle glabrous. *Outer florets* with very slender corollas. *Cypselas* faintly 8-10-ribbed, glabrous; pappus in a single row, white, shining. DC. Prod. V. 443; Hook. fil. Fl. Br. Ind. III. 262. *B. fasciculata*, DC. l.c. 442; Clarke Comp. Ind. 81. *B. fistulosa*, Kurz in Journ. As. Soc. Beng. 1877, II. 187. *B. holosericea*, *racemosa*, *spinellosa*, *gracilis*, *purpurea*, and *leptoclada*, DC. l.c. 442, 443. *Conyza fistulosa*, Roxb. Fl. Ind. III. 429. *Conyza racemosa*, *sericea*, *glomerata*, *gracilis*, *purpurea* and *holosericea*, Wall. Cat. 3002, 3021, 3055, 3064, 3076, 3103.

PENANG: Deschamps.—DISTRIB. British India, Malay Archipelago, China.

4. *BLUMEA WIGHTIANA*, DC. in Wight Contrib. 14. An erect, little-branched herb, 1 to 3 feet high, covered everywhere with silky white, scanty or copious, soft, sub-adpressed hairs; stem terete, about as thick as a goose-quill at the base, striate, brown, and nearly glabrous (from the fall of the hairs) when old. *Leaves* diminishing in size from below upwards, thickly membranous, obovate-oblong or elliptic-obovate, the apex acute or sub-acute, gradually narrowed from about the middle to the short petiole; the edges with a few irregular coarse teeth, sometimes slightly lobed; both surfaces olivaceous-brown when dry, and clothed, but especially the lower, with adpressed, short white pubescence; main-nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.25 to 3 in.; breadth .5 to 1.25 in.; petioles from .1 to .25 in. long or even more, sometimes auricled about the middle. *Heads* paniculate, about .3 or .4 in. across, axillary, solitary or in pairs (reduced cymes), or 4 to 6 in very short rounded axillary cymes on peduncles of varying length, but always short, the upper few inches of the stem crowded by a dense mass of cymes. *Involucral bracts* in several rows, diminishing in size outwards, the inner linear, somewhat longer than the pappus, all pubescent and 1-nerved; receptacle naked. *Outer florets* very numerous, their corollas very slender. *Inner florets* about 4, much wider than the outer. *Cypselas* small, puberulous; pappus in a single row, white. DC. Prod. V. 435; Clarke Comp. Ind. 74; Kurz in Journ. As. Soc. 1877, II. 156 (excl. syn. *hymeno-*



*phylla*); Hook. fil. Fl. Br. Ind. III. 261. *B. trichophora*, *parvifolia*, and *phyllostachya*, DC. l.c. 436, 437, 438. *Conyza lactucaefolia*, *paniculata*, *bifoliata*, and *Wightiana*, Wall. Cat. 3088 (*in part*), 3090a, 3091, 3093. *Erigeron molle*, Don Prod. 172.

PENANG and SINGAPORE: By roadsides, not common.—DISTRIB. British India and Ceylon, Malay Archipelago, tropical Australia and Africa.

5. *BLUMEA LACERA*, DC. in Wight Contrib. 14. An erect herb, 2 to 3 feet high; stems at the base nearly as thick as a goose-quill, adpressed-pubescent. *Leaves* thickly membranous, oblanceolate obtuse or sub-acute, much narrowed to the petiole, the edges unequally and remotely dentate; both surfaces olivaceous when dry, the lower somewhat the paler and with thin, pale pubescence; the upper glabrous, sub-scabrid; length 1·5 to 2 in.; breadth ·5 to 1 in.; petiole ·3 to ·5 in. long. *Heads* ·3 in. across, sub-sessile or sessile, in small rounded crowded cymes, on slender ebracteate axillary peduncles, 1 to 2·5 in. long, subtended by small leaf-like bracts, and occupying the upper half of the stem. *Involucral bracts* linear-oblong, tomentose, about as long as the pappus; receptacle naked. *Heads* ·4 in. across, sessile or nearly so, in a lax, shortly-branched, leafy, cymose, pubescent panicle, 12 to 18 in. long. *Involucral bracts* nearly uniform, linear, acuminate, 1-nerved, puberulous, as long as the pappus. *Receptacle* slightly convex, naked. *Cypselas* narrowly oblong, glabrous, not ribbed; pappus in a single row, white. DC. Prod. V. 436; Clarke Comp. Ind. 76; Hook. fil. Fl. Br. Ind. III. 263. *B. Musra*, DC. l.c. 435; Deless. Ic. Sel. IV. t. 23. *B. villosa*, Schultz-Bip. in Pl. Hohenack. n. 2a. *Conyza lacera*, Roxb. Fl. Ind. III. 428; Wall. Cat. 3082. *C. thyrsiflora*, *villosa*, and *Musra*, Ham.; Wall. Cat. sub 3082, 3083, 3095. *C. lactucifolia*, DC. l.c. 435; Wall. Cat. 3088 (*in part*); Burm. Fl. Ind. 180, t. 59, f. 1.

PERAK: *Scortechini* 141, 1430. SINGAPORE: *Cantley*; *Hullett* 227.—DISTRIB. British India, Ceylon, Malay Archipelago, China, tropical Africa.

6. *BLUMEA MEMBRANACEA*, DC. Prod. V. 440. A rigid erect herb, 1 to 2 feet high; stem at the base half as thick as a goose-quill, minutely pubescent from base to apex, terete, striate. *Leaves* thinly membranous, oblanceolate, much tapered to the base, sub-sessile, the apex acute, the edges coarsely and often irregularly dentate, sometimes lobulate; both surfaces pale olivaceous-brown when dry, the lower paler, sparsely strigose; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; length 2 to 3·5 in.; breadth ·8 to 1·5 in.; the leaves of the upper part of the stem smaller and bract-like. *Heads* ·25 in. in diam., sessile or sub-sessile, in spikes several inches long, from the

axils of small leaf-like bracts, arranged in a narrow pseudo-panicle occupying the upper half of the stem. *Involucral bracts* linear, acuminate, pubescent, 1-nerved, as long as the inner pappus. *Corollas* very narrow; receptacle naked. *Cypsels* small, glabrous; pappus white, in two rows, the outer very short. Hook. fil. Fl. Br. Ind. III. 265. *B. hymenophylla*, DC. l.c. 440. *Conyza membranacea* and *hymenophylla*, Wall. Cat. 3019, 3038. *C. virens*, Wall. Cat. 3037d. *C. diffusa*, Roxb. Fl. Ind. III. 429.

PENANG: Curtis 2759; Deschamps.—DISTRIB. British India, Malay Archipelago.

#### 9. LAGGERA, Schultz.-Bip.

Annual or perennial herbs. *Leaves* alternate, often rigid and decurrent. *Heads* paniced or axillary, heterogamous, disciform. *Outer flowers* ♀, in several rows, fertile, filiform, the mouth minutely toothed. *Disk-flowers* ♂, in several rows, fertile, tubular, 5-fid. *Involucre* campanulate; bracts many-rowed, narrow, often rigid, the outer shorter; receptacle flat, naked. *Anthers* 2-lobed or sagittate at the base; the auricles obtuse or acute, often unequal, not tailed or connate with the adjoining anthers. *Style-arms* of the hermaphrodite flowers and the pappus as in *Blumea*.—DISTRIB. 9 or 10 species, in tropical Africa and British India.

LAGGERA FLAVA, Benth. in Gen. Pl. II. 290. A glabrous or puberulous herb, 6 to 30 in. high; stems striate, simple or corymbosely branched. *Leaves* membranous, shining, glabrous; the radical sometimes on short petioles; the cauline sessile; the lower cauline oblong, acute, cordate and sub-amplexicaul at the base; the upper cauline smaller and narrower than the lower, lanceolate; all sharply and unequally toothed; main-nerves about 8 pairs, distinct, like the wide reticulations. *Heads* few, .25 in. in diam., on slender peduncles; receptacle glabrous; corollas yellow; anthers sagittate. *Cypsels* minute, glabrous. Clarke Comp. Ind. 90; Hook. fil. Fl. Br. Ind. III. 270. *Blumea flava*, DC. Prod. V. 439. *Erigeron falcatum*, Don Prod. 172; Kurz in Journ. As. Soc. Beng., 1877, II. 191 (excl. syn.). *Conyza fasciculata*, Wall. Cat. 3017.

PENANG: Wallich.—DISTRIB. British India.

This has not been collected within our area since Wallich's time.

#### 10. PLUCHEA, Cass.

Shrubs or herbs, tomentose or glutinous. *Leaves* alternate, dentate or rarely entire, sometimes pinnatifid. *Heads* usually small, in terminal corymbose cymes, or large and sub-solitary, heterogamous, disci-

form, white yellow, or lilac. *Outer florets* ♀, in several series, fertile, filiform. *Disk-florets* ♂, few, sterile, tubular and 5-fid. *Involucre* broadly ovoid or campanulate; its bracts few or in many rows, imbricate, ovate or lanceolate, dry, rigid; receptacle flat, naked. *Corollas* of the ♀ flowers filiform, shorter than their own styles, their apices with 3 teeth; *corollas* of the ♂ flowers regular, tubular, the limb slightly widened, 5-cleft. *Anthers* sagittate at the base, their basal auricles tailed. *Style-arms* of the ♂ flowers filiform, entire or bifid. *Cypselas* small, 4- or 5-angled. Hairs of *pappus* slender, rigid, in a single series, free, or (in the sterile cypselas) connate in groups.—*DISTRIB.* About 30 species, tropical and sub-tropical.

*PLUCHEA INDICA*, Less.; DC. Prod. V. 451. A low shrub, glabrous or nearly so; stems smooth, terete. *Leaves* membranous, obovate or oblanceolate, the apex obtuse or acute, acuminate or apiculate, narrowed to the base; edges dentate, serrate or sub-serrate; both surfaces olivaceous-brown when dry, glandular; main-nerves 3 to 6 pairs, curving upwards, bold beneath; length .5 to 2.75 in.; breadth .3 to 1.25 in.; petioles .1 in. to .4 in. long. *Heads* .25 in. in diam., in compound terminal puberulous corymbose cymes, much longer than the leaves; involucre bracts few, rather broad, obtuse. *Florets* of the disk 3; those of the ray numerous. *Cypselas* minute, ribbed, nearly glabrous; pappus scanty, spreading, reddish-white. Wight Ill. t. 131; Clarke Comp. Ind. 93; Hook. fil. Fl. Br. Ind. III. 272; Prain Bengal Plants 600. *P. foliosa*, DC. l.c. 451. *Conyza corymbosa*, Roxb. Fl. Ind. III. 426; Wall. Cat. 3009. *C. indica*, Miq. Fl. Ind. Bat. II. 58. *Baccharis indica*, Linn.

*MALACCA*: Griffith. *PENANG*: Wallich. *SINGAPORE*: Kurz. *DINDINGS*: Curtis 3451. *PERAK*: Scortechini 848; King's Collector 2893.—*DISTRIB.* British India, Malay Archipelago, China, Australia

# 11. SPHERANTHUS, Linn.

Annual herbs with spreading branches. *Leaves* alternate, toothed, decurrent. *Flower-heads* proper, small, heterogamous, disciform, sessile, on a common receptacle, bracteate or not, and forming solitary, globose, or ovoid, a head-like terminal cluster, usually bearing at its base an involucre of a few empty bracts. *Outer florets* ♀, few or many, fertile, slender; *inner* solitary or few, ♂, fertile or sterile; involucre narrow, its bracts dry, narrow, unequal, acute; receptacle small, naked; pappus none. *Florets*: ♀ with filiform, minutely 2-3-toothed corollas; ♂ with regular corollas with thickened tube and 4-5-toothed limb. *Anthers* with sagittate bases acute or tailed. *Style* of ♂ florets with filiform arms or entire. *Cypselas* oblong, sub-



compressed, without pappus.—DISTRIB. About 8 species, tropics of Asia, Africa, and Australia.

*SPHERANTHUS AFRICANUS*, Linn. Sp. Pl. 1314. Annual, glabrous or pubescent, the stem and branches with long decurrent, entire wings. *Leaves* membranous, oblanceolate, acute or sub-acute, with a small bristle-point at the apex, the base narrowed and confluent with the wing of the branch, the edges bristle-serrate; length 1 to 3 in.; breadth .25 to 1.25 in. *Clusters of heads* globose, .3 to .4 in. in diam., pedunculate, their involucre few, scarious, rounded or jagged, not imbricate; the peduncles .25 to .4 in. long, glabrous, with a wing widening at the base. *Female florets* about 15, gibbous. Hook. fil. Fl. Br. Ind. III. 275; Prain Bengal Plants, 601. *S. africanus* and *S. microcephalus*, Willd. Sp. Pl. III. 2395. *S. microcephalus*, DC. Prod. V. 360; Clarke Comp. Ind. 97. *S. indicus*, Willd. l.c. 2394; Roxb. Hort. Beng. 62, Fl. Ind. III. 446. *S. africanus*, Wall. Cat. 3179 (*in part*).

MALACCA: Griffith. KEDAH: King's Collector 1701. SINGAPORE: Ridley 5069. PENANG: Curtis 1942; Deschamps. PROVINCE WELLESLEY: Ridley 7125. PERAK: Scortechini 1640.—DISTRIB. British India, Malay Archipelago, China, Philippines, Australia, Africa.

## 12. EMILIA, Cass.

Annual or perennial herbs, glabrous or hairy, often glaucous, sometimes sarmentose. *Leaves* alternate, radical, crowded, petiolate, entire, toothed or lyrate-pinnatifid; cauline few, stem-clasping. *Heads* on long peduncles, solitary or loosely corymbose, ebracteolate at the base, homogamous, discoid, yellow or red; florets all ♀, fertile, tubular, the limb elongate and 5-toothed. *Involucre* cylindric; its bracts in a single series, equal, free or cohering, striate; *receptacle* flat, naked. *Style-arms* sub-terete, their apices short and obtuse, or long and acute. *Cypselas* sub-terete, or 5-ribbed or -angled; pappus hairs numerous, white, silky.—DISTRIB. Species 14 or 15; all Indo-Malayan and tropical African.

*EMILIA SONCHIFOLIA*, DC. Prod. VI. 302. Annual, usually erect, sometimes diffuse and sarmentose, 12 to 30 in. high. *Leaves*: the lower lyrate-pinnatifid or sinuate-dentate, rarely elliptic, glabrous or puberulous, sometimes scaberulous, 1.5 to 4 in. long; petioles variable but rarely exceeding an inch in length; cauline leaves much smaller, hastate or linear-hastate, dentate, sessile and auriculate, more or less stem-clasping. *Heads* .4 in. long and the same in diam. when expanded, on long ebracteate or scantily bracteate peduncles, collected in lax terminal long pedunculate spreading corymbs. *Involucre* nearly as long as the purple florets, ecalyculate; its bracts linear-oblong, sub-



acute. *Cypselas* truncate at each end, minutely hairy. DC. in Wight Contrib. 24. *E. sonchifolia*, vars.  $\alpha$  and  $\beta$ , Clarke Comp. Ind. 174. *Calcalia sonchifolia*, Linn. Sp. Pl. 835; Roxb. Fl. Ind. III. 413; Don Prod. 180; Wall. Cat. 3144. *E. glabra*, Heyne in Wall. Cat. 3145. *Gynura ecalyculata*, DC. l.c. 298. *Prenanthes sarmentosa*, Wall. Cat. 3262E. *E. scabra*, DC. l.c. 303; Wight l.c. 1123. *E. mucronata*, Clarke Comp. Ind. 175.

SINGAPORE: *Hullett* 240. PENANG: *Deschamps*; *Scortechini*; *Stolickza*.—DISTRIB. British India, Malay Archipelago, China.

VAR. *minor*, King & Gamble. Little more than a foot high, lower leaves broadly ovate, truncate at the base, on long narrow winged petioles.

PERAK: *King's Collector* 301. PENANG: in Klang and Batu Gaja jungles: *Deschamps*.

In this variety the terminal lobe only of the leaf is developed, the lower part being long and narrow like a petiole.

### 13. GYNURA, Cass.

Succulent herbs, rarely undershrubs, sometimes climbers, glabrous or hispid. *Leaves* alternate, entire, toothed or pinnatisect. *Heads* solitary or in corymbs, bracteolate at the base, homogamous, disciform, yellow or purplish. *Florets* yellow: all the  $\sigma$  tubular, fertile (rarely a few of the outer ones more slender and  $\rho$ ) the limb 5-toothed. *Involucre* cylindric or sub-campanulate; the bracts 10 or 12, in a single series, narrow, equal; their margins scarious; receptacle flat, pitted or shortly fimbriate. *Anthers* with bases entire or sub-auricled. *Style-arms* slender; their apices long, slender, subulate, hispid. *Cypselas* narrow, many-ribbed; hairs of pappus copious, in many series, slender, white.—DISTRIB. Species about 20, Asia, Africa, and Australia.

Scandent; leaves subentire or slightly dentate, petiolate .. 1. *G. sarmentosa*.  
An erect herb; leaves always boldly dentate and often pinnatisect  
or pinnatifid, sessile and often sub-amplexicaul or auriculate .. 2. *G. bicolor*.

1. GYNURA SARMENTOSA, DC. Prod. VI. 298. Stem and branches loosely twining, glabrous except the puberulous peduncles, thinner than a goose-quill, pale brown and striate when dry. *Leaves* succulent, elliptic to elliptic-lanceolate, acute or acuminate, the base cuneate, the edges subentire or slightly dentate, both surfaces brown when dry, glabrous; main-nerves 4 or 5 pairs, spreading, faint on both surfaces; length 1 to 3 in.; breadth  $\frac{1}{4}$  to 1 in.; petioles of the lower leaves  $\frac{1}{5}$  to  $\frac{1}{4}$  in.; the small upper leaves often sessile. *Heads* few, .65 to .75 in. long, and as much in diam., on slender puberulous

pedicels usually in scanty, lax, long-peduncled, axillary and terminal cymes longer than the leaves; bracteoles of the panicle and of the calyculus at the base of the involucre few, small, linear. *Involucre* spreading little, its bracts narrowly oblong, subacute or blunt, glabrous; their edges scarious, nearly as long as the florets. *Cypselas* small, brown, with 10 puberulous ribs; pappus white. Hook. fl. Fl. Br. Ind. III. 335. *G. Finlaysoniana*, DC. l.c. 299; Deless. Ic. Sel. IV. t. 55. *Cacalia cylindrifolia*, *reclinata*, and *Finlaysoniana*, Wall. Cat. 3150, 3151, 3162. *Sonchus volubilis*, Rumph. Herb. Amb. V. t. 103 f. 2.

In all the provinces, common.—DISTRIB. Malayan Archipelago; Siam; Philippines.

2. *GYNURA BICOLOR*, DC. Prod. VI. 299. Herbaceous, 2 or 3 feet high, glabrous or sparsely and minutely glandular-hairy on the upper part; stems erect, branched, about the thickness of a quill near the base, boldly striate when dry. *Leaves* pinnatisect or pinnatifid, the lobules acutely dentate; the terminal lobe narrow and acuminate, narrowed at the base into a petiole varying in length from .5 to 1 in.; the upper sessile and often auriculate at the base, or shorter and narrowly obtuse with large teeth; length 2.5 to 5 in.; breadth .4 to 3 in. *Heads* about .5 in. long, less in diam. Involucral bracts narrow, with scarious margins and acute often recurved tips. *Cypselas* very slender, much ribbed, sub-glabrous; pappus copious, white, tinged with pink. Hook. fl. Fl. Br. Ind. III. 335. *Cacalia bicolor*, Roxb. Fl. Ind. III. 412; Salisb. Hort. Parad. t. 25; Bot. Regist. t. 110.

SINGAPORE: Ridley 1618. JOHORE: Ridley 2741; King. PERAK: Wray 1445, 3599. PENANG: Deschamps. MALACCA: Griffith (K.D.), 3235.—DISTRIB. China, Moluccas.

#### 14. SIEGESBECKIA, Linn.

Glandular-pubescent herbs. *Leaves* opposite, toothed. *Heads* in leafy panicles, heterogamous, sub-radiate, yellow or white. *Ray-florets* ♀, in a single series, fertile, the corollas short-tubed, with 2-3-fid limb or a short, broad ligule. *Disk-florets* ♂, fertile, or the inner ones sterile; the corollas regular, tubular, the limb campanulate and 5-fid or narrow and 3- to 4-toothed. *Involucre* campanulate or hemispheric, the bracts few, herbaceous, glandular, the outer usually 5, spatulate, spreading; the inner enclosing the ray-florets. *Receptacle* small; the pales membranous, concave. *Anthers* with entire bases. *Style* of ♂ florets with short, flattened, sub-acute arms. *Cypselas* obovoid-oblong, often incurved, their apices obtuse;

pappus none.—**DISTRIB.** Six species, one cosmopolitan, tropical and sub-tropical, the others South American and African.

**SIEGESBECKIA ORIENTALIS**, Linn. Sp. Pl. 900. An erect annual, 1 to 3 feet high, branching, the lower branches opposite, everywhere clothed with pubescence, often glandular and crisped. *Leaves* membranous, opposite, the lower ovate sub-rhomboid, the upper ovate-lanceolate, dentate or crenate, passing into linear-lanceolate, and sometimes entire; all cuneate at the base; both surfaces olivaceous when dry; the upper scabrid, hispid; the lower more softly hairy; main-nerves 3 or 4 pairs, curved, spreading; length 1 to 4 in.; petioles very short or absent. *Involucre* with the outer bracts longer than the inner. *Cypselas* black, the outer enclosed in the glandular involucreal bracts. Boiss. Fl. Orient. III. 250; DC. Prod. V. 495; Wight Ic. 1103; Wall. Cat. 3182; Hook. fil. Fl. Br. Ind. III. 304; Prain Bengal Plants, 607. *S. glutinosa*, Wall. Cat. 3182. *S. brachiata* and *S. orientalis*, Roxb. Fl. Ind. III. 432. *Minyranthes heterophylla*, Turcz. in Bull. Soc. Imp. Nat. Misc. 1851, I. 181.

In all the provinces, near habitations.

#### 15. ECLIPTA, Linn.

Strigose or hirsute annuals. *Leaves* opposite. *Heads* small, axillary or terminal, pedunculate, heterogamous, rayed. *Ray-florets* ♀, sub-2-seriate, fertile or sterile, ligulate, small, entire or bifid, white rarely yellow. *Disk-florets* ♂, fertile, tubular, 4-5-fid. *Involucre* hemispheric or broadly campanulate; its bracts sub-2-seriate, herbaceous, the outer large and broad; receptacle flat or nearly so, the outer pales enclosing several florets; the inner ones narrow, sometimes absent. *Anthers* with obtuse, almost entire, bases. *Style-arms* flattened, with short triangular or obtuse appendages. *Cypselas* of the ray narrow, triquetrous, sometimes barren; those of the disk stouter, somewhat compressed laterally, the apex entire, toothed or 2-aristate.—**DISTRIB.** 7 species in South America and Australia, and 1 cosmopolitan in the tropics.

**ECLIPTA ERECTA**, Linn. Mant. II. 266. An erect or diffuse branched slender herb, hirsute or strigillose. *Leaves* variable in form and size, sessile or with very short petioles; linear, oblong-lanceolate or narrowly elliptic; narrowed at both ends; main-nerves 3 or 4 pairs, spreading, faint; length 1 to 4 in.; breadth .2 to .5 in. *Heads* .3 to .4 in. in diam., solitary or in pairs from the leaf-axils; the peduncles .25 to 1.5 in. long, when in pairs always unequal. *Involucreal bracts* equal to or longer than the flowers, unequal, ovate or obovate, apiculate. *Cypselas* scabrid, without pappus. Clarke Comp. Ind. 134; Hook.

fl. Fl. Br. Ind. III. 304; Prain Bengal Plants; 610. Lam. Ill. t. 637. *E. alba*, Hassk. Pl. Jav. Rar. 528; Clarke Comp. Ind. 134; Hook. fl. Fl. Br. Ind. III. 304. *E. marginata*, Boiss. Fl. Orient. III. 249. *E. prostrata*, Linn. Mant. II. 266; Roxb. Fl. Ind. III. 438. *E. prostrata*, *undulata*, and *parviflora*, Wall. Cat. 3209, 3210, 3213. *Verbesina alba* and *prostrata*, Linn. Sp. Pl. 902.

In all the provinces. In and near cultivated ground.—DISTRIB. The tropics generally.

#### 16. WEDELIA, Jacq.

Hirsute or scabrid-pubescent herbs or undershrubs, sometimes scandent. *Leaves* opposite. *Heads* axillary or terminal, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate, spreading, entire, or 2-toothed at the apex. *Disk-florets* ♂, fertile or the inner sterile; the corolla tubular, regular, with elongate 5-toothed limb. *Involucre* campanulate or sub-hemispheric; its bracts sub-2-seriate, the outer 3 to 5 usually herbaceous, the inner dry; receptacle flat or convex, the pales enclosing the flowers. *Anthers* entire or sub-sagittate at the base. *Style* of ♂ florets with acute arms hirsute at their tips. *Cypselas* cuneate-oblong or obovoid, thick, smooth or tubercled, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened; pappus none, or reduced to a toothed cup or ring, or sometimes of short scales with occasionally a few bristles.—DISTRIB. Species about 70, tropical and sub-tropical.

WEDELIA BIFLORA, DC. in Wight Contrib. Fl. Ind. 18. Scandent; stem and branches hispid-puberulous when very young, afterwards almost glabrous, obtusely 4-angled, grooved when dry. *Leaves* membranous, broadly ovate or ovate-subrhomboid to lanceolate, apex acuminate, edges coarsely serrate except at the broad, slightly cuneate base; both surfaces dull olivaceous green when dry, minutely reticulate, sparsely hispid-puberulous; main-nerves one large pair ascending from the base of the midrib to near the apex branching outwards and one or two smaller pairs from above the middle of the midrib, all distinct on both surfaces; length 2 to 4.5 in.; breadth 1.25 to 2.75 in.; petioles .75 to 1.5 in., those of the branches smaller. *Heads* about .5 in. in diam., solitary on a short peduncle .75 in. or less in length, or 2 to 4 on peduncles two or three times as long. *Involucral* bracts in two rows, oblong or ovate-lanceolate, apiculate, concave, scabrid-puberulous outside like the peduncles, often recurved. Ripe *cypselas* triquetrous, scaberulous, the apex with some hairs and several short bristles, one longer than the others. Hook. fl. Fl. Br. Ind. III. 306. *W. scandens*, Benth.; Prain Bengal Plants, 612; Clarke Comp. Ind. 136 (*excl. syn.*). *Woolstonia*



*biflora* and *W. scabriuscula*, DC. Prod. V. 546, 547. *W. biflora*, Wight Ic. 1108. *Verbesina biflora*, Linn. Sp. Pl. Ed. II. 1272. Wall. Cat. 3207 (in part). *V. dichotoma*, Wall. Cat. 3024 (in part). *Eclipta scabriuscula*, Wall. Cat. 3212 (partly). *Acemella biflora*, Spreng. Syst. III. 591.

On the sea coast, common.

#### 17. SPILANTHES, Linn.

Annual herbs. *Leaves* opposite. *Heads* axillary or terminal, usually on long peduncles, heterogamous and rayed, or homogamous and disciform. *Ray-florets* ♀, in a single series, fertile, ligulate, white or yellow. *Disk-florets* ♂, fertile, tubular, with 4- or 5-fid limb. *Involucre* ovoid or campanulate, the bracts sub-2-seriate; receptacle convex, elongate, the pales enclosing the flowers often connate with the ovary into a stalk. *Anthers* with truncate entire or bifid bases. *Style-arms* of ♂ florets truncate. *Cypselas* of ray-florets triquetrous or dorsally compressed, the margins and angles usually ciliate; pappus none or of 2 or 3 bristles.—DISTRIB. About 40 species, chiefly tropical American.

SPILANTHES ACMELLA, Murr. Syst. ed. XIII. 610. Erect or ascending, glabrous, branched, 1 to 2 feet long; the branches as thick as a crow-quill, striate, glabrous, pale brown when dry. *Leaves* membranous, ovate-lanceolate or elliptic, with sub-acute apex and cuneate base, the edges crenate serrate or entire; main-nerves a single pair, ascending; length .75 to 1.5 in.; petioles .1 to .3 in. long. *Heads* ovoid-conical, .35 to .5 in. long, on slender peduncles 1 to 2.5 in. long, solitary or in very lax panicles. *Involucral bracts* short, oblong, blunt or sub-acute, 3-nerved. *Ray-florets* minute. *Cypselas* sometimes marginate, scabrid or smooth; pappus of one or two bristles or absent. DC. Prod. V. 623; Prain Bengal Plants, 614; Wall. Cat. 3285; Clarke Comp. Ind. 138; Hook. fil. Fl. Br. Ind. III. 307. *S. calva*, DC. l.c. V. 625; Wight Ic. 1109. *S. pseudo-Acmella*, Linn.; DC. l.c. 625, and in Wight Contrib. 19; Wall. Cat. 3185. *S. oleracea*, Jacq. Hort. Vind. II. t. 135; Roxb. Fl. Ind. III. 410; DC. l.c. 624. *Bidens fervida* and *B. fixa*, Lamk. Dict. I. 415, 416. *Cotula conica*, Wall. Cat. 3185. *Verbesina Acmella*, Linn. Sp. Pl. 901. *V. pseudo-Acmella*, Linn. l.c. 901.

MALACCA: Griffith (K.D.) 3186; Cuming 2361. PERAK: Scortechini 1400. PENANG: Deschamps.

#### 18. SYNEDRELLA, Gaertn.

Annual branched herbs. *Leaves* opposite, petiolate, dentate. *Heads* small, axillary and terminal, heterogamous, rayed. *Involucre* ovoid or

oblong, its bracts few; the outer one or two foliaceous, passing into the flat scarious pales of the small receptacle. *Ray-florets* few, ♀, ligulate, with short broad 2-3-toothed lamina. *Disk-florets* ♂, tubular, regular, the limb 4-toothed. *Anthers* syngenesious, their bases sub-entire. *Style-arms* of ♀ florets long, acute. *Cypselas* of ray-florets much compressed dorsally, smooth, their edges winged and with long teeth; those of the ♂ few, narrower, compressed or trigonous often muricate; pappus in both consisting of 2 (rarely more) bristles.—DISTRIB. Species 2, tropical American, 1 also Asiatic and African.

*SYNEDRELLA NODIFLORA*, Gaertn. Fruct. II. 456, t. 171, f. 7. An erect dichotomous annual with terete wiry glabrous branches thicker than a crow-quill; all parts more or less scaberulous. *Leaves* membranous, opposite, petiolate, ovate, acute, the base cuneate, the edges serrate or crenate (sometimes obscurely so); main-nerves 3 or 4 pairs, the lower pair long and bold, the others short and faint; both surfaces minutely and sparsely strigose, and greenish when dry; length .75 to 3 in.; breadth .3 to 1.25 in.; petioles .1 to .4 in. often ciliate on the edges. *Heads* .25 in. in diam., axillary, solitary or in small clusters, usually sessile but sometimes on short peduncles; inner bracts of the involucre linear-lanceolate, shining. *Cypselas* of the inner flowers muricate, with 2 unequal hispid pappus hairs longer than themselves and than the corolla; outer cypselas shorter, broader, smooth, black; their edges winged, deeply toothed, pale. Hook. Exot. Flora, t. 60; Clarke Comp. Ind. 139; Hook. fil. Fl. Br. Ind. III. 308; Prain Bengal Plants, 615. *Verbesina nodiflora*, Linn. Amoen. Acad. IV. 290.

Near cultivation, common.

#### 19. BIDENS, Linn.

Herbaceous, annual or perennial, sometimes scandent. *Leaves* opposite, entire, irregularly lobed or 1-2-pinnatisect. *Heads* small and corymbose or larger and sub-solitary, heterogamous and rayed. *Ray-florets* in one series, neuter or rarely ♀, fertile, the corolla ligulate, yellow or white, spreading, entire or somewhat toothed. *Disk-florets* ♂, fertile, tube, cylindric, limb shortly 5-fid; occasionally homogamous from the abortion of the ray-florets. *Involucre* campanulate or sub-hemispheric, its bracts in two series, often slightly connate below; the outer short herbaceous or long and leafy, the inner membranous; receptacle flat or convex; its pales narrow, little concave. *Anthers* entire or bluntly sagittate at the base. *Style* of ♀ florets with arms hirsute upwards and short acute or long apices. *Cypselas* dorsally compressed or somewhat tetragonous, linear or cuneiform, often narrowed but not beaked above; pappus of 2 to 4 persistent,

retrorsely barbellate arms.—DISTRIB. About 120 species, chiefly American.

*BIDENS PILOSA*, Linn. Sp. Pl. 832. An erect, very variable, glabrous pubescent or pilose herb, 6 to 24 in. high; stems when dry 4-angled. *Leaves* 3-fid to 3-partite, or 2-3-pinnatifid, their segments broadly or narrowly ovate to lanceolate, serrate. *Heads* 3 to 4 in. across, on long stout petioles of varying length, terminal or axillary. *Ray-flowers* when present white or yellow, often absent. *Involucral bracts* shorter than the flowers, broadly oblong, with scarious margins. *Cypselas* black, compressed, long, narrow, slender, ribbed; pappus of 3 or 4 bristles shorter than the cypselas, pale brown.

VAR. 1 *pilosa* proper, Hook. fil. Fl. Br. Ind. III. 309; leaves 3-fid or 3-sect, their segments broadly or narrowly ovate or lanceolate, serrate. *B. pilosa*, Linn.; DC. Prod. V. 597; Clarke Comp. Ind. 140; Prain Bengal Plants, 616. *B. leucantha*, Willd. *B. chinensis*, Willd.; Wall. Cat. 3189 (*in part*). *B. tripartita* and *B. bipinnata*, Wall. Cat. 3187 (*in part*).

VAR. 2 *bipinnata*, Hook. fil. l.c. 309; leaves bipinnately compound, their segments ovate lanceolate or linear, entire lobed or toothed. *B. bipinnata*, Linn.; Roxb. Fl. Ind. III. 411. *B. chinensis*, Wall. Cat. 3189 (*in part*). *B. Wallichii*, DC. Prod. V. 598.

VAR. 3 *decomposita*, Hook. fil. l.c. 310; leaves decompositely pinnatifid, segments linear, slender. *B. decomposita*, Wall. in DC. Prod. V. 602, Cat. 3188; Clarke Comp. Ind. 141 *excl. var. β*.

In all the provinces: in waste ground near cultivation, but not common.—DISTRIB. In all warm countries.

## 20. TRIDAX, Linn.

A perennial herb. *Leaves* opposite, pinnatisect, with few narrow segments. *Heads* solitary on very long peduncles, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate or bilabiate, the outer lip large 3-fid, the inner small and 2-fid or none. *Disk-florets* ♂, fertile, tubular, the limb elongate and 5-fid. *Involucral bracts* in few series, the outer short broad herbaceous; receptacle flat or convex; its scales membranous. *Anthers* with short acute auricles at their bases. *Style-arms* of the ♂ flowers hairy above, their apices subulate. *Cypselas* oblong or depressed-globose, silky; pappus of unequal aristate feathery bristles.—DISTRIB. 7 species, tropical American, 1 being an introduced weed in the tropics of Asia.

*TRIDAX PROCUMBENS*, Linn. Sp. Pl. 900. Procumbent, hirsute, with slightly branched stems as thick as a crow-quill. *Leaves* membranous, few, ovate-lanceolate, deeply and irregularly serrate, 5 to 2 in. long.



*Heads* .4 to .6 in. in diam., on slender erect solitary peduncles 3 to 8 in. long. *Cypselas* brown; pappus shining, white. DC. Prod. V. 679; Wall. Cat. 3197; Clarke Comp. Ind. 142; Hook. fil. Fl. Br. Ind. III. 311; Prain Bengal Plants, 618.

In cultivated and waste places : an introduction.

## 21. CENTIPEDA, Lour.

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, axillary, sessile or racemose, heterogamous, disciform, yellow. *Outer florets* ♀, in many rows, fertile, their corollas minute, obscurely lobed. *Disk-florets* ♂, few, fertile, their corollas with short tube and campanulate 4-fid limb. *Involucre* hemispheric, its bracts in 2 series, spreading in fruit; receptacle naked. *Anthers* obtuse and entire at the base. *Style-arms* of ♂ flower short, truncate. *Cypselas* 4-angled, the apices obtuse, the angles hairy; the hairs sometimes hooked; pappus none.—DISTRIB. 43 species, Asiatic, Australian, and South American.

CENTIPEDA ORBICULARIS, Lour. Fl. Cochinch. III. 493. An annual prostrate herb with numerous thin rooting stems, glabrous or sparsely tomentose. *Leaves* obovate-oblong or cuneate, .2 to .5 in. long, sparsely toothed. *Heads* .1 to .15 in. in diam., globose, solitary, axillary, subsessile. *Florets*, ♀ minute, numerous, tubular, minutely 3-toothed; ♂ 10 to 12, 4-toothed. *Cypselas* with simple hairs. Hook. fil. Fl. Br. Ind. III. 317; Prain Bengal Plants, 620. *C. minuta*, Benth. in Bth. & Hook. fil. Gen. Pl. II. 230; Clarke Comp. Ind. 151. *Myriogyne minuta*, Less.; DC. Prod. VI. 139. *Cotula sternutatoria*, Wall. Cat. 3259. *C. minima*, Willd. Sp. Pl. III. 2170. *Dichrocephala Schmidii*, Wight Ic. 1610. *Artemisia sternutatoria*, Roxb. Fl. Ind. III. 423. *A. minima*, Linn. Sp. Pl. 849. *Sphaeromorphaea centipeda*, DC. l.c. 140.

In all the provinces : by the sides of roads in cultivated ground, not common.

## 22. ARTEMISIA, Linn.

Herbs or shrubs, usually fragrant. *Leaves* alternate, 1- to 3-pinnatisect, serrate or entire. *Heads* small, numerous, racemose or paniced, solitary or in fascicles (never corymbose), heterogamous or homogamous, disciform. *Outer florets* ♀, in a single series, fertile, very slender, 2- to 3-toothed. *Disk-florets* ♂, fertile or sterile, the limb 5-fid. *Involucre* ovoid, sub-globose or hemispheric; bracts in few series, the outer shorter, their margins scarious; receptacle flat or convex, naked or hairy. *Anthers* with entire obtuse bases. *Style-arms* of the ♂ florets with truncate, usually penicillate, tips. *Cypselas* very minute, oblong,



ellipsoid or sub-obovoid, faintly striate; pappus none.—DISTRIB. About 240 species in the north temperate regions mostly of the Old World.

*ARTEMISIA VULGARIS*, Linn. Sp. Pl. 848. A small shrub; stems as thick as a goose-quill, brown when dry, sub-glaucous and with sparse white pubescence. *Leaves* membranous, varying much in shape and size, those near the base several inches long, large pinnatipartite or bi-pinnatipartite, the pinnules oblong, the ultimate lobes entire with sub-aristate apices, leaves of the stem diminishing in size upwards, lacinate, and passing near the apex into simple linear bracts less than .5 in. long; all glabrous on the upper surface and white adpressed-pubescent on the lower. *Heads* about .15 in. long, cylindric or narrowly campanulate, sessile, solitary or in small clusters, in axillary sub-second spikes of varying length, the upper part of the stem forming a long spike. *Involucral bracts* only 5 or 6, broadly lanceolate or oblanceolate, the inner scarious. *Corollas* glabrous. DC. Prod. V. 112; Boiss. Fl. Orient. III. 371; Roxb. Fl. Ind. III. 420; Clarke Comp. Ind. 161; Hook. fil. Fl. Br. Ind. III. 325. *A. indica*, Willd.; DC. l.c. 114; Roxb. Fl. Ind. III. 419; Wight Ic. 1112; Wall. Cat. 3293. *A. dubia*, Wall. Cat. 3307; DC. l.c. 110. *A. myriantha*, Wall. Cat. 3297; DC. l.c. 112. *A. paniculata*, Roxb. Fl. Ind. III. 418. *A. leptostachya*, DC. l.c. 113. *A. grata*, Wall. Cat. 3294 (*in part*); DC. l.c. 114. *A. lavandulifolia*, DC. l.c. 110.

In all the provinces, near cultivation, not common and probably introduced.—DISTRIB. Europe, Northern Asia, India, mountains of the Malayan Archipelago.

### 23. CREPIS, Linn.

Annual or perennial herbs, glabrous or hairy, hairs all simple. *Leaves* alternate, radical or cauline, the latter often stem-clasping, entire toothed or pinnatifid. *Heads* pedunculate, solitary, fasciculate or corymbose, yellow or red, homogamous, ligulate. *Involucre* cylindric or campanulate; bracts either multi-seriate and regularly imbricate, or the outer smaller and shorter than the single series of inner; base of midrib often thickened after flowering; receptacle flat, rarely concave, naked or shortly fimbriate. *Corollas* ligulate, with broad 5-toothed apices. *Anthers* syngenesious, their bases sagittate, the auricles acute or shortly setaceous. *Gypsels* more or less fusiform or oblong, rarely short and cylindric, often slender, glabrous or scaberulous, 10- to 20-ribbed, the apex narrowed or beaked; pappus usually copious, short or long, the hairs simple, soft, usually silvery, rarely brownish and stiff or brittle.—DISTRIB. Species about 10, chiefly in the northern regions of the Old World.

CREPIS JAPONICA, Benth. Fl. Hongk., 194. Annual; glabrous or puberulous; stems one or more from the same root, 6 to 18 in. high. Radical leaves oblanceolate, runcinate-pinnatifid or sinuately toothed, 1 to 2.5 in. long, usually on petioles .5 to 1.5 in. long; cauline leaves few, much smaller and often sessile. Heads .2 in. long and .3 in. in diam. when expanded, on short, slender pedicels with linear minute bracteoles at their bases, collected at the apices of the long, slender stems in compact or lax corymbose cymes. Involucres shorter than the florets, their bracts in two rows, the outer very short; the inner 6 or 7, narrowly oblong, blunt, with narrow hyaline margins and dark, thickened midribs. Cypselas .1 in. long, contracted below the apex, but not beaked, compressed, with many smooth or puberulous ribs, equal to or shorter than the soft, white pappus. Hook. fil. Fl. Br. Ind. III. 395; Prain Bengal Plants, 627. *C. lyrata*, Clarke Comp. Ind. 253. *Youngia lyrata*, Cass.; Thw. Enum. Pl. Ceyl. 168. *Youngia Thunbergiana*, *runcinata*, *napiifolia*, *Poosia*, *ambigua*, *fastigiata* and *striata*, DC. Prod. VII. 192, 193. *Y. napiifolia*, Wight Ic. 1147. *Lactuca napiifolia*, DC. in Wight Contrib. 27. *Chondrilla runcinata*, Wall. Cat. 3272. *Prenanthes Poosia* and *napiifolia*, Wall. Cat. 3265, 3277. *P. japonica*, Linn. Mant. 107. *P. striata*, Blume Bijdr. 885.

In all the provinces, near or in cultivated ground.

#### Order LXII. STYLIDIEÆ.

Herbaceous plants, rarely undershrubs. Leaves radical or scattered or fasciculate on the stem, more or less subverticillate, entire, often small and narrow, no stipules. Flowers in terminal racemes or thyrsoid or corymbose panicles, irregular, perfect, pedicels bracteate. Calyx-tube adnate to the ovary; limb 2-lipped, upper lip 3-, lower 2-flowered. Corolla gamopetalous, 5-lobed, 4 lobes spreading, the fifth (lip) smaller, irregular, the lobes imbricate. Stamens 2, parallel, inserted on a glandular disk surmounting the ovary; filaments connate with the style into a column; anthers sessile on the column, the cells sub-confluent. Ovary inferior, 2-celled; style entire or divided into two stigmas; ovules many in each cell, on axile placentas on the middle of the dissepiment, anatropous. Fruit a 2-celled capsule, sometimes 1-celled by the suppression of the septum, the valves cohering at the base. Seeds minute, numerous, sub-globose; albumen fleshy; testa thin; embryo minute, next the hilum.—DISTRIB. Species about 100, Australian, with a few in tropical Asia, New Zealand, and Antarctic America.

## STYLIDIUM, Sw.

Herbs, with the habit leaves and inflorescence of the Order. *Calyx-lobes* 5, bilabiate. *Corolla* irregularly 5-lobed, 4 lobes sub-erect in pairs, the fifth smaller, recurved. *Stamens* in an elongate column, often recurved or reflexed, especially when irritated. *Ovary* 2-celled, stigma entire.—DISTRIB. 85 Australian species and 3 Indian or Malayan.

STYLIDIUM TENELLUM, Swartz in Gesellsch. Nat. Berl. Mag. 1807, 51. t. 2, fig. 3, *not of Br.* A small erect herb; stem simple, leafy, glabrous, 4 to 8 in. high, dichotomous, compressed. *Leaves* scattered, alternate, oblong or oblong-obovate, lower ones broader .2 to .3 in. long, upper ones narrower, getting gradually smaller upwards and passing gradually into bracts; nerves of lower leaves 3, from the base. *Flowers* sessile, 2 to 5, alternate; bracts minute, linear. *Calyx* bilabiate, upper 3-, lower 2-lobed, lobes linear. *Corolla* irregularly 5-lobed, 4 lobes erect linear, the fifth recurved, spatulate. *Staminal column* exsert, stamens 2, anthers 2-celled, connivent. *Ovary* inferior, elongate, 2-celled, many-seeded, stigma entire. *Capsule* 2-celled, 2-valved, .5 to .7 in. long; seeds minute, papillose. DC. Prod. VII. 336; Hook. fil. and Th. in Journ. Linn. Soc. II. 8; Miq. Fl. Ind. Bat. II. 571; Kurz in Flora, 1872, 304. *S. roseum*, Kurz in Journ. As. Soc. Beng. XLV. ii. 137, XLVI. ii. 212; Clarke in Hook. f. Fl. Br. Ind. III. 420.

PENANG: Ridley 7103. PROVINCE WELLESLEY, at Butterworth: G. King. MALACCA: Swartz.—DISTRIB. Eastern Bengal and Burma, in Dacca, Chittagong and Mergui.

*S. uliginosum*, Swartz, is recorded in Fl. Br. Ind. as from "MALACCA *vide H. f. and T.*"; as we have seen no specimens, we consider it sufficient to record the fact. In Miq. Fl. Ind. Bat. it is *S. Kunthii*, Wall., that is recorded from Malacca, and it seems more likely that this is right as Griffith obtained it at Mergui.

## Order LXIII. GOODENOVIÆ.

Shrubs, undershrubs, but chiefly herbs, juice not milky. *Leaves* alternate or radical, rarely opposite, entire dentate or occasionally pinnatifid; stipules none. *Flowers* hermaphrodite, axillary or in terminal spikes, racemes or panicles, regular or irregular, bracts and bracteoles occasionally present. *Calyx* with the tube adnate to the ovary or free; lobes 5, sometimes very small, sometimes connate in a ring or obsolete. *Corolla* gamopetalous, inserted on the calyx, usually white, yellow or blue, rarely red; lobes 5, valvate, usually induplicate-winged. *Stamens* 5, alternate with the corolla-lobes, inserted on the



disk crowning the ovary; free or connate in a ring around the style; anthers 2-celled, the cells parallel, dehiscent longitudinally and introrsely. *Ovary* 1-2-celled; style simple with a cup-shaped sheath including the stigma; ovules 1 or many in each cell, erect or ascending, rarely pendulous, inserted on the dissepiment or central. *Fruit* an indehiscent drupe or a capsule with 2 or 4 valves usually dehiscent irregularly. *Seeds* albuminous; testa thin crustaceous or thick and hard; embryo erect in the axis of the fleshy albumen, the radicle inferior.—*DISTRIB.* Over 200 species, mostly Australian, a few in New Zealand, Antarctic America, the Pacific Islands, or on the coasts of tropical Asia, Africa, and the West Indies.

### 1. *SCÆVOLA*, Linn.

Herbs, undershrubs or shrubs. *Leaves* simple, alternate, rarely opposite, entire or toothed. *Flowers* axillary, solitary or in dichotomously branched cymes, sessile or pedicellate. *Calyx* with the tube adnate to the ovary, turbinate, ovoid or globose; limb short, annular or 5-lobed, sometimes obsolete. *Corolla* oblique, split to the base behind, lobes sub-equal or the two uppermost shorter, at length digitately patent. *Stamens* free. *Ovary* 2-celled, with solitary erect ovules in each cell, or 1-celled with 1-2 erect ovules; sheath cupular; stigma truncate or divaricately 2-lobed. *Fruit* an indehiscent drupe, exocarp thin or fleshy, endocarp hard and woody rarely crustaceous. *Seeds* solitary; embryo smooth, cotyledons sometimes broader than the inferior radicle.—*DISTRIB.* About 60 species, 2 Asiatic, 8-10 of the Pacific Islands and the coasts of Asia, 1 extending to the coasts of Africa and the West Indies, the rest Australian.

*SCÆVOLA KOENIGII*, Vahl Symb. III. 36 (1794). An evergreen large glabrous shrub with stout stem and branches, soft spongy pith and coarse fibrous wood. *Leaves* alternate, sessile, obovate-oblong, obtuse at apex, decurrent at base, 3 to 6 in. long, about 2 in. broad, entire or obscurely crenate, more or less fleshy when green, membranous when dry, silky pubescent on both sides or somewhat glabrous on the upper surface, tufted hairy in the axils; midrib stout, prominent, broad, main-nerves 10-12 pair, slender, arching upwards and joining near the margin, secondary nerves few slender, reticulations many, indistinct. *Flowers* white, in axillary few-flowered dichotomous pubescent cymes shorter than the leaves; bracts small, subulate, about .1 in. long; common peduncle .5 to .6 in. long; pedicels .1 to .2 in. long; bracteoles 2, similar to the bracts. *Calyx-tube* adnate to the ovary, .2 in. long, densely villous; lobes .2 to .3 in. long, linear-lanceolate or spatulate, ciliate, pubescent, enlarged in fruit. *Corolla-tube* .7 to .8 in.



long, narrow, pubescent without, villous within; lobes valvately induplicate-winged, .25 to .4 in. long, lanceolate, prominently veined, villous-hairy within. *Stamens* erect, free, inserted around the ovary-sheath, .75 in. long; filaments thin, anthers ovate, introrse, cells parallel, connective produced above with short divergent lobes. *Ovary* 2-celled, crowned with the oblong bifid stigma which is surrounded by a long-fringed sheath; ovules 1 in each cell, erect. *Fruit* a 2-celled ovate-globose succulent drupe, .3 to .5 in. in diam., depressed above, ribbed, endocarp bony. Lamk. Ill. t. 124, fig. 2; DC. Prod. VII. 505; Hook. f. and Th. in Journ. Linn. Soc. II. 8; Hook. f. Bot. Mag. t. 2732; Blume Bijdr. 730; Miq. Fl. Ind. Bat. II. 580; Kurz in Journ. As. Soc. Beng. XLVI. ii. 212, For. Fl. II. 84; Clarke in Hook. f. Fl. Br. Ind. III. 421; Trimen Fl. Ceyl. III. 54; Cooke Bomb. Flora, II. 69; Benth. Fl. Austr. IV. 86. *S. sericea*, Forst.; DC. l.c. 506; Blume Bijdr. 750; Miq. Fl. Ind. Bat. II. 581. *S. Taccada*, Roxb. Hort. Beng. 15, Fl. Ind. I. 527; DC. l.c. 505; Dalz. and Gibs. Bomb. Fl. 134; Ham. in Trans. Linn. Soc. XVII. 250; Wall. Cat. 1314; Wight Ill. t. 137. *S. Lobelia*, Ham. in Trans. Linn. Soc. XVII. 250; De Vriese Goodenov. 20-26 and in Ned. Kruidk. Arch. II. 20, *not of Linn.* *S. Plumieri*, Blume Bijdr. 730, *not of Vahl.* *S. montana*, Lab. Sert. Austr.-Caled. 41, t. 42; DC. l.c. 506. *S. velutina*, Presl in Rel. Haenck. II. 57; DC. l.c. 506. *S. Bela-Modagam*, Rœm. and Sch. Syst. V. 163; DC. l.c. 505. *S. Leschenaultii*, DC. l.c. 506. *S. macrocalyx*, De Vriese Gooden. 26, tab. 3, figs. 1-4. *S. chlorantha* and *S. Lambertiana*, De Vriese, l.c. 27, 28. *S. lativaga*, Hance in Walp. Ann. II. 1054. *Lobelia frutescens*, Linn. Fl. Zeyl. 148. *L. Taccada*, Gærtn. Fruct. I. 119, tab. 25, fig. 5. *L. Plumieri*, Burm. Fl. Ind. 186, *not of Linn.* *Cerbera Salutaris*, Lour. Fl. Cochinch. 136. *Buglossum litoreum*, Rumph. Herb. Amb. IV. 116, t. 54. "Béla-Modagam," Rheede Hort. Mal. IV. t. 59.

PENANG: Wallich 1314. MALACCA: Griffith. JOHORE: Jensen. SINGAPORE: Sir R. Schomburgk 82; G. King; G. Thomson.—DISTRIB. Sea-shores of India from Sind to Ceylon; Burma; Malay Islands and eastwards to Australia and Polynesia.

#### Order LXIV. CAMPANULACEÆ.

Herbs, undershrubs, rarely shrubs; erect or climbing; often with milky juice. *Leaves* alternate or rarely opposite, entire toothed or rarely lobed, no stipules. *Inflorescence* axillary or terminal; flowers solitary, racemose or paniculate; bracts small; bracteoles none (present in *Sphenoclea*). *Calyx-tube* adnate to the ovary, limb few- or many-

lobed or -partite, lobes usually persistent in fruit, valvate or imbricate in bud. *Corolla* gamopetalous, tubular, rotate or campanulate, superior, sometimes bilabiate; lobes as many as those of the calyx, valvate or induplicate-valvate, sometimes 1, 2, or all free to the base. *Stamens* equal in number to the corolla-lobes and alternate with them; inserted on the epigynous disk or (in *Sphenoclea*) on the corolla-tube; filaments free or connate in a tube; anthers linear, oblong or ovate, free or connate in a tube, 2-celled, the cells parallel, dehiscing longitudinally and introrsely. *Ovary* usually inferior, 2-5- rarely more-celled; placentas axile, many ovuled; style simple, clavate, within the staminal tube; stigma-lobes as many as the ovary-cells; ovules anatropous, erect horizontal or pendulous. *Fruit* capsular or baccate, crowned by the persistent calyx-lobes, dehiscing vertically or laterally, or indehiscent. *Seeds* very many, small, albuminous; testa thin, coriaceous; embryo erect, radicle inferior.—DISTRIB. Over 1,000 species, scattered throughout the globe, chiefly in temperate regions.

Tribe I. LOBELIEÆ. Corolla 2-lipped, cleft dorsally to the base; anthers connate.

Fruit a capsule, 2-valved at the summit .. .. 1. LOBELIA.

Tribe II. CAMPANULEÆ. Corolla regular; anthers free or imperfectly connate.

Flowers solitary, peduncled .. .. 2. CAMPANULEA.  
 Flowers in a dense scorpioid spike .. .. 3. PENTAPHRAGMA.  
 Flowers in a dense cylindric spike .. .. 4. SPHENOCLEA.

### 1. LOBELIA, Linn.

Herbs of various sizes, sometimes very small, sometimes erect and very tall; undershrubs or shrubs. *Leaves* alternate, usually toothed. *Inflorescence* either 1-flowered, in the axils of leaves or bracts, or in a terminal leafy raceme; bracteoles very small or none. *Calyx-tube* adnate to the ovary, turbinate, hemispheric, obovoid or rarely oblong-linear; limb 5-partite or 5-fid, lobes often unequal. *Corolla* oblique, 2-lipped; upper lip 2-, lower 3-partite or -lobed. *Staminal tube* free from the corolla or adnate only at the base; anthers with 2 lower tipped with bristles, 3 upper naked, or else all penicillate. *Ovary* inferior, 2-celled; placentas hemispheric; ovules numerous; stigma shortly bifid. *Capsule* loculicidally 2-valved within the calyx-tube. *Seeds* very many, minute, ellipsoid, compressed or trigonous.—DISTRIB. About 200 species, throughout the world, though scarce in Europe and Western Asia.

LOBELIA AFFINIS, Wall. Cat. 1311. A prostrate often rooting herb with much-branched stem, pubescent or glabrate. *Leaves* ovate-

rotundate, acute at apex, rounded or truncate or cordate and more or less decurrent at base, .5 to 2 in. long, .5 to 1.5 in. broad, mucronate-dentate or -crenate, membranous, usually strigosely hairy on the nerves especially beneath, sometimes nearly glabrous; midrib slender, main-nerves 4-6 pairs; petiole .3 to .6 in. long, more or less winged by the decurrent margins of the blade, strigosely hairy. *Flowers* single, on slender pedicels about .6 to 1 in. long; bracts minute; pedicels usually deflexed in fruit. *Calyx-tube* adnate to the ovary, ribbed, strigose, obconical; lobes 5 linear spreading, .1 to .2 in. long, pilose. *Corolla* purple, .2 to .25 in. long, 2 upper lobes falcate-lanceolate, 3 lower connate, teeth short. *Staminal tube* as long as or longer than corolla, anthers all penicillate. *Ovary* 2-celled, style long, stigma bifid, lobes rounded, recurved, ovules many. *Capsule* ribbed, strigose. *Seed* small, ellipsoid trigonous. DC. Prod. VII. 360; Miq. Fl. Ind. Bat. II. 574; Hook. f. and Th. in Journ. Linn. Soc. II. 27; Clarke in Hook. f. Fl. Br. Ind. III. 424; Trimen Fl. Ceyl. III. 57; Prain Beng. Plants I. 633. *L. zeylanica*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 113; Kurz in Journ. As. Soc. Beng. XLVI. ii. 211, *not of Linn.* *L. subcuneata*, Miq. Fl. Ind. Bat. II. 574. *L. succulenta* and *L. Heyneana*, Bl. Bijdr. 728.

PENANG: Ridley 7162, 10185; J. Scott. PERAK: Ridley 2902; Curtis 2025; Scortechini 309, 344; King's Collector 2376. SINGAPORE: Kurz.—DISTRIB. Eastern Bengal, Burma, Ceylon, Malay Islands, Southern China.

*Isotoma longiflora*, Presl, is an introduced West Indian plant found in shady places. PENANG: Deschamps. SINGAPORE: Hullett 29; Kunstler 90.

## 2. CAMPANUMÆA, Blume.

Perennial erect or climbing herbs with tuberous roots. *Leaves* opposite, petiolate, usually cordate. *Flowers* usually large, solitary, peduncled, terminal or axillary on short leafless flowering branches. *Calyx-tube* adnate to the ovary, or below it, persistent, 4- to 6-partite with spreading lobes. *Corolla* broadly campanulate, the base adherent to the calyx-tube, 4- to 6-lobed; white, greenish, or lurid-purple in colour. *Stamens* 4-6, inserted round the base of the corolla-tube; filaments dilated; anthers free. *Ovary* 4-6-celled, placentas thick, many ovuled; style cylindric, stigma 4-6-cleft with short broad lobes. *Fruit* a berry, sub-globose or with truncate top, indehiscent. *Seeds* very many, small, ellipsoid.—DISTRIB. 5-6 species, all of Eastern tropical and sub-tropical and temperate Asia.

CAMPANUMÆA CELEBICA, Blume Bijdr. 727. An erect herb reaching 4 to 5 feet in height, with horizontal spreading smooth branches.

*Leaves* ovate-lanceolate, acuminate, rounded at base or cuneate, often unequal, 3 in. long, .75 to 1 in. broad, serrate or almost entire, the serratures mucronate; chartaceous; glabrous above, glaucous and glabrous or with scattered pubescence beneath; midrib slender, main-nerves 4-6 pairs at about 30 degrees with the midrib, arching and joining near the margin; petiole short, .15 to .25 in. long. *Flowers* solitary, terminal or in the forks of a dichotomous cyme; peduncles .3 to .5 in. long, those of terminal flowers shorter; bracts small linear. *Calyx-tube* in bud shortly adnate to the ovary, in fruit often half-way up; teeth .2 to .3 in. long, linear-lanceolate, often serrate. *Corolla* epigynous, shortly campanulate, white or yellowish-white, .3 to .5 in. long; lobes 5, triangular acute. *Stamens* .15 in. long; anthers linear, .05 in. long, filaments dilated. *Ovary* 5-6-celled; style thickened upwards, then cylindric, angled; stigma about 4-cleft. *Berry* .3 to .4 in. in diam., globose, white, slightly succulent, becoming nearly dry, breaking up irregularly. *Seeds* very many, minute, ovoid, flattened, testa smooth. A. DC. Monog. Camp. 120, Prod. VII. 423; Clarke in Hook. f. Fl. Br. Ind. III. 436; Prain Beng. Plants I. 634. *C. truncata*, Endl. Gen. Pl. I. 515. *Codonopsis truncata*, Wall. Cat. 1301; DC. l.c. 123; Miq. Fl. Ind. Bat. II. 566. *C. leucocarpa* and *C. celebica*, Miq. l.c. II. 565, 566. *C. albiflora*, Griff. Notul. IV. 279. *Cyclocodon lancifolium*, Kurz in Flora 303; Journ. As. Soc. Beng. XLVI. 210, partly. *C. truncatum*, Hook. f. and Th. in Journ. Linn. Soc. II. 18. *C. adnatus*, Griff.; Benth. in Gen. Pl. II. 558. *Campanula lancifolia*, Roxb. Fl. Ind. I. 505; DC l.c. 485.

PENANG: Curtis 2089. PERAK: Wray 3236; Scortechini.—DISTRIB. India from the Sikkim Himalaya to Chittagong and Burma, Malay Islands, Southern China.

### 3. PENTAPHRAGMA, Wall.

Fleshy perennial herbs, with short, often rooting, little-branched stems. *Leaves* alternate, broad, rounded, sometimes very unequal at the base, petioles rather long. *Inflorescence* of axillary or lateral dense bracteate scorpioid spikes or racemes, the flowers generally in pairs between the bracts. *Calyx-tube* adnate to the ovary; lobes 4-5, superior, obtuse, persistent, unequal in size. *Corolla* campanulate, the tube short, lobes 4-5. *Stamens* 5 alternate with the corolla-lobes, epigynous or on the corolla tube; anthers ovate or oblong; filaments dilated, curved outwards when open. *Ovary* 3-5-celled; style short, cylindric; stigma large, cylindric or conical, obscurely 4-5-lobed; placentas bifid, ovules many. *Fruit* a more or less succulent berry, dehiscence unknown (cf. Roxb. Fl. Ind. I. 506). *Seeds* very many,



small, ellipsoid, testa reticulate-rugose.—DISTRIB. About 7 species, all from the Malay Archipelago and Peninsula.

Leaves markedly serrate, very unequal-sided .. ... 1. *P. begoniæfolium*.  
Leaves entire or only slightly dentate, nearly or quite equal-sided:—

Stem short, flower spikes from upper axils, calyx and corolla usually 5-lobed .. .. 2. *P. Scortechinii*.  
Stem elongate, flower spikes from lower axils, calyx and corolla usually 4-lobed .. .. 3. *P. Ridleyi*.

1. *PENTAPHRAGMA BEGONIÆFOLIUM*, Wall. Cat. 1313. A short-stemmed fleshy herb, with flexuose rooting stems and few branches covered with crispate ferruginous woolly hairs. *Leaves* alternate, ovate, the base obliquely excised on one side, cordate on the other, shortly acuminate at apex, 6 to 10 in. long, 4 to 5 in. broad, coarsely serrate, sparsely crispate-villous; midrib thick, near the excised side, main-nerves 1 on the excised side, 4-5 on the other, the nerves again branching outwards; petiole .3 to 1 in. long, crispate-villous as are the nerves beneath. *Inflorescence* a short, 1 to 4 in. long, scorpioid, shortly peduncled spike, with 2-ranked flowers between ovate membranous bracts .25 in. long, axillary in the uppermost leaves; flowers dull yellow supported by an oblong or spatulate villous bracteole .2 in. long, .1 in. broad. *Calyx-tube* adnate to the ovary, ovoid, crispate villous; lobes 5 obtuse, rounded, recurved, shorter than the tube, crispate villous without, glabrous within. *Corolla* white, campanulate, 5-lobed, the lobes spreading and recurved, marcescent, oblong obtuse glabrous. *Stamens* 5, free, .1 to .125 in. long; anthers oblong, filaments dilated at base. *Ovary* turbinate, 3-celled; ovules many, on axile placentas; style short, stigma cylindrically peltate, obscurely 3-lobed. *Fruit* a berry, dehiscence not known; seeds very many, testa prominently reticulate. DC. Prod. VII. 495; Hook. f. and Th. in Journ. Linn. Soc. II. 26; Miq. Fl. Ind. Bat. II. 568; Kurz in Journ. As. Soc. Beng. XLVI. ii. 210; Clarke in Hook. f. Fl. Br. Ind. III. 437; Baillon Hist. des Plantes, VIII. 323, t. 152-154; Schönl. in Engl. and Pr. Nat. Pflz.—Fam. IV. 5, 60, fig. 37. *Phyteuma begoniifolium*, Roxb. Hort. Beng. 85, Fl. Ind. I. 505; Jack in Hook. Bot. Misc. I. 276, t. 57.

PENANG: Wallich 1313; Maingay 2266 (K.D. 712); Stoliczka; Deschamps; Hullett 200; Kunstler 1598. PERAK: Scortechinii 336 (part); Wray 3668. SINGAPORE: Lobb.—DISTRIB. Mergui, Griffith. A plant of the undergrowth in dense shady forests. Ridley (Trans. Linn. Soc. III.) (1893, 315) says that it "grows on rocks along the Tahan River, and also far in the woods, in rocky valleys, common."

2. *PENTAPHRAGMA SCORTECHINII*, n. sp., King & Gamble. A

short-stemmed fleshy herb, creeping and rooting below, afterwards erect; branches flexuose, more or less crispately pilose. *Leaves* alternate, ovate or oblong-ovate, blunt or very shortly acuminate at apex, usually cuneately narrowed below and partly decurrent, sometimes slightly excised on one side; 4 to 10 in. long, 2 to 6 in. broad, entire or faintly dentate, margin often recurved, fleshy, glabrous or slightly rough above, crispately pilose and pale beneath; midrib very thick, sometimes slightly to one side, main-nerves about 4 pair, arched upwards and again branched; petiole thick, 2 to 3 in. long, crispately pilose. *Inflorescence* a short, 1 to 2 in. long, scorpioid, very shortly peduncled spike, with 2-ranked flowers between ovate obtuse bracts, axillary either singly or in pairs from the axils of upper leaves, or lateral below them; flowers white with a yellow centre, bracteole wanting. *Calyx-tube* adnate to the ovary, ovoid, villous without; lobes 5, ovate obtuse, unequal in size, .15 to .2 in. long, 3-nerved. *Corolla* campanulate, tube short; lobes 5 spreading and recurved, marcescent, glabrous. *Stamens* free, .05 to .1 long, recurved; anthers linear; filaments narrowly winged. *Ovary* turbinate, 3-celled; ovules many immersed in fleshy axile placentas; style short, stigma conical, obscurely lobed. *Fruit* a berry, apparently indehiscent; seeds very many, ellipsoid, papillose-reticulate.

PERAK: *Scortechini* 336; *Wray* 352, 389; *King's Collector* 958, 2653. PAHANG: *Ridley*. Dense forest undergrowth in the hills at 2,000-4,000 feet, in moist places.

VAR. *parvifolia*, King & Gamble, a smaller more erect plant, scarcely more than 6 in. high; much less villous, the leaves smaller, oblong, obtuse or slightly acute, 4 in. long and 2 in. broad; the inflorescence shorter and the flowers smaller.

PAHANG, at Salian River: *Ridley*. SINGAPORE, at Bukit Timah: *Ridley*.

VAR. *flocculosa*, King & Gamble, leaves ovate rotundate, thick, younger ones densely clothed beneath with crispate villous felt, margins recurved; the main-nerves rarely more than two pairs, all starting from close to the base. *Inflorescence* short, much curved, usually supported by a pair of rounded reduced leaves. *Corolla-lobes* prominently recurved. *Anthers* oblong, cells often divaricate.

PERAK: *Scortechini*. JOHORE, at Goonong Pulai, 1,800 feet: *G. King*.

This species is a very variable one, and some forms almost run into *P. begoniæ-folium*. Owing to the calyx and corolla being persistent and more or less marcescent, they vary much in size in different flowers on the same plant, and it is difficult to find characters for the varieties, one or both of which may eventually prove to be separate species.

3. *PENTAPHRAGMA RIDLEYI*, n. sp., King & Gamble. A fleshy herbaceous plant, 10 to 12 in. in height; stem .25 in. thick, smooth, at first creeping afterwards erect. *Leaves* ovate, equal-sided, bluntly acute at apex, cuneate at base, 6 to 8 in. long, 3.5 to 4.5 in. broad, glabrous on both surfaces, entire or only very minutely dentate on the margin; midrib broad, main-nerves 4-5 pairs nearly straight, slanting upwards; petiole 1 in. long. *Inflorescence* a short, 1 to 1.5 in. long, nearly sessile spike, with 2-ranked flowers between ovate-spathulate usually 3-nerved glabrous pale bracts; each flower with a .15 in. long, linear-spathulate, 1-nerved bracteole, ciliate at tip; flowers small, .2 to .25 in. long. *Calyx-tube* adnate to the ovary; lobes 4-5, equal or unequal in size, usually .1 in. long, 3-nerved, the nerves arching. *Corolla-tube* short, lobes 4-5, linear-oblong, emarginate, recurved, glabrous without, minutely pubescent within, white spotted at base with purple, nerves 3. *Stamens* adnate at base to the corolla-tube, .05 to .07 in. long, anthers club-shaped, filaments dilated below. *Ovary* turbinate, 3-celled; ovules many on axile placentas; stigma rounded, 3-5-lobed, on a very short conical style. *Fruit* a berry, conical at top, apparently indehiscent; seeds rather few and large; testa beautifully reticulate.

SINGAPORE: *Ridley* 103.—In damp ravines at Bukit Timah (Herb. Kew).

#### 4. *SPHENOCLEA*, Gaertn.

An annual erect glabrous herb, of marshy places. *Leaves* alternate, lanceolate, entire. *Flowers* in dense cylindric terminal or leaf-opposed peduncled spikes; very small, sessile, each with one bract and two bracteoles. *Calyx-tube* adnate to the ovary, turbinate or hemispherical; lobes 5, sub-foliaceous. *Corolla* campanulate, 5-lobed, valvate. *Stamens* 5, inserted on the base of the corolla; filaments shortly dilated; anthers short, free. *Ovary* semi-inferior, 2-celled; placentas axile, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* semi-inferior, depresso-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, minute, oblong. A single species.

*SPHENOCLEA ZEYLANICA*, Gaertn. *Fruct. I.* 113, t. 24, fig. 5. An erect annual herb, 1 to 2 feet high. *Leaves* alternate, lanceolate, narrowed at both ends, 2 to 3 in. long, .25 to 1 in. broad, entire, sessile or shortly petioled, smooth, midrib and main-nerves faint. *Flowers* in dense, cylindric, terminal or leaf-opposed, peduncled spikes; peduncles .5 to 1 in. long; spikes .5 to 1.5 in., bract and bracteoles very small. *Calyx-tube* adnate to the ovary, turbinate or hemispherical, lobes 5, ovate, .05 to .06 in. long, somewhat enlarged in fruit and inflexed over

the disk. *Corolla* campanulate, 5-lobed, .07 to .1 in. long, greenish-white, lobes short, rounded. *Stamens* 5, inserted at the base of the corolla-tube; filaments short dilated; anthers 2-celled, rounded, about as long as filaments. *Ovary* semi-inferior, 2-celled; placentas axile, stalked, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* depressed-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, oblong, minute, scabrous; testa reticulate with rectangular cells. Wall. Cat. 1516; Roxb. Fl. Ind. I. 507, Fl. Ind. ed. Carey and Wall. II. 116; Miq. Fl. Ind. Bat. II. 569; Kurz in Journ. As. Soc. Beng. XLVI. ii. 209; Clarke in Hook. f. Fl. Br. Ind. III. 438; Trimen Fl. Ceyl. III. 519; Baillon Hist. des Plantes, VIII. 327, t. 158-161; Cooke Bomb. Flora, II. 75; Prain Beng. Plants I. 635; Schönk. in Engl. and Pr. Pflz—Fam. IV. 5, 61, fig. 38. *S. Pongatium*, A. DC. Prod. VII. 548; Wight Ill. t. 138. *Pongatium indicum*, Lamk. Ill. II. 444; Encyc. Meth. Bot. V. 564. *Gaertnera Pangati*, Retz Obs. VI. 24. *Rapinia herbacea*, Lour. Fl. Cochinch. (ed. Willd.) I. 157. *Sphenoclea*, Griff. Notul. IV. 276. "Pongati," Rheede Hort. Mal. XI. 47, t. 24.

MALACCA: *Griffith*.—DISTRIB. Swampy places and wet fields, and along river banks in tropical regions of both hemispheres.

#### Order LXV. VACCINIACEÆ.

Shrubs or small trees, often epiphytic, with stems swollen at the base. *Leaves* alternate or in pseudo-whorls, entire dentate or serrate, evergreen, ex-stipulate. *Flowers* in terminal or axillary racemes, or solitary and axillary, hermaphrodite, usually regular; pedicels 1-bracteate and also often with 2 bracteoles, often articulate beneath the ovary. *Calyx* campanulate or cupular, the tube adherent to the ovary, its limb persistent on the fruit, usually 5-toothed. *Corolla* tubular (sometimes inflated), campanulate or globose, 5-toothed or 5-lobed, usually imbricate, deciduous. *Stamens* 10, epigynous, inserted at the base of the corolla-tube; anthers opening by apical pores, or often produced into 2 tubes, opening by slits, filaments flattened, free or connate by their bases. *Ovary* inferior, crowned by an epigynous disk, 5-celled or falsely 10-celled; style cylindric; stigma simple; ovules many (rarely few), the placentas axile or pendulous from the upper inner angle of each cell. *Fruit* baccate, rarely dry, 5- or falsely 10-celled. *Seeds* numerous or few (rarely only 1) in each cell, small, compressed, albuminous. Species about 350, natives chiefly of cold and temperate regions throughout the world.



Corolla long and tubular or campanulate, with long segments:—

Calyx-tube terete .. .. .	1. AGAPETES.
Calyx-tube 5-winged or 5-angled .. .. .	2. PENTAPTERYGIIUM.
Corolla small, campanulate or ovoid, its lobes short .. .. .	3. VACCINIUM.

1. AGAPETES, D. DON.

Shrubs, often epiphytic, the stems often much swollen near the base. *Leaves* usually coriaceous, alternate, sometimes in pseudo-whorls, from linear to elliptic, entire or toothed, sessile or with short petioles, often glandular near the base. *Flowers* axillary, solitary, corymbose or in fascicles; the pedicel often thickened or articulate under the ovary, bracts small. *Calyx* globose, the limb with 5 persistent teeth or lobes. *Corolla* tubular or campanulate, the limb with short or long lobes, red, but often with transverse marks or with greenish-white lobes. *Stamens* 10, usually with short filaments; *anthers* oblong, each with 2 long apical processes, opening by pores or slits, often spurred behind. *Disk* pulvinate, often lobed. *Ovary* 5-celled or falsely 10-celled; style cylindric; stigma capitate; ovules numerous. *Berry* globose, nearly dry or succulent, 5- or 10-celled, sometimes opening by pores round the disk within the calyx-teeth. *Seeds* numerous, ellipsoid, testa lax.—DISTRIB. 30 species, mostly Himalayan, a few Malayan.

AGAPETES GRIFFITHII, Clarke in Hook. f. Fl. Br. Ind. III. 449. An epiphytic shrub, 3 to 15 feet long, with a tuberous stem; young branches half as thick as a goose-quill, terete, glabrous. *Leaves* thinly coriaceous, oblong-lanceolate to ovate-lanceolate, always caudate-acuminate, the base rounded, both surfaces pale olivaceous-brown when dry, glabrous, minutely reticulate; main-nerves 5 or 6 pairs, curved, ascending, faint on both surfaces; length 3·5 to 6 in.; breadth 1 in. to 2·65 in.; petiole ·15 in. long or under. *Flowers* ·3 to ·4 in. long, axillary, always on slender pedicels four or five times as long as themselves, with 1 or 2 narrow bracteoles near the base, glabrous, axillary, solitary, in pairs or in lax racemes. *Calyx* ·1 to ·2 in. long (enlarging in fruit), campanulate, with 5 deep spreading triangular lobes. *Corolla* ·25 in. long, tubular-campanulate, the mouth with 5 triangular sub-erect acute lobes. *Anthers* inserted at the base of the corolla-tube, linear, with 2 long apical beaks dehiscing longitudinally, and 2 posteriorly-projecting curved spurs; filaments shorter than the anthers, hairy. *Fruit* globular, glabrous, crowned by the small inflexed calyx-lobes. *Seeds* about 20, compressed, tubercled, black.

MALACCA: *Griffith*. PERAK: at elevations of 2,800 to 4,000 feet, *Wray* 1071; *King's Collector* 3831, 6363, 8051; *Ridley* 5532; *Scortechini*.

## 2. PENTAPTERYGIIUM, Klotsch.

Shrubs, often epiphytic and with stems much thickened at the base. *Leaves* alternate, ovate or lanceolate, sub-entire or toothed, coriaceous, often with glands at the apex of the petiole. *Flowers* axillary, solitary, fascicled or corymbose; the pedicels thickened near the apex, cupular and jointed under the ovary, bracts small. *Calyx-tube* large, tubular, with 5 wings or prominent angles; its lobes 5, enlarged in fruit. *Corolla* tubular, the mouth with 5 short lobes, coloured red or yellow, and often transversely marked. *Stamens* 10, epigynous, the filaments short; anthers elliptic, produced into 2 long beaks, opening by apical pores or slits, and often spurred behind. *Ovary* 5-celled or spuriously 10-celled; style cylindric, often exserted; stigma sub-capitate; ovules very numerous. *Fruit* baccate, 5-winged or 5-ribbed, 5-celled or spuriously 10-celled. *Seeds* numerous, ellipsoid. —DISTRIB. About 6 species, natives of Eastern Himalaya, Khasia, Malay Peninsula.

PENTAPTERYGIIUM SCORTECHINII, n. sp., King & Gamble. A sarmentose shrub, 4 to 10 feet long, growing on rocks or trees; young branches somewhat thinner than a goose-quill, terete, glabrous, pale brown when dry. *Leaves* thickly coriaceous, ovate to ovate-rotund, the apex blunt or sub-acute, the base broad and rounded but sometimes slightly emarginate, the edges much recurved when dry; upper surface shining, glabrous, pale olivaceous-brown; the lower darker; midrib strong, deeply depressed on the upper surface, prominent on the lower; main-nerves about 4 pairs, spreading, the two lower much the larger, all curved, mostly depressed on the upper surface and prominent on the lower; length 1.75 to 3 in.; breadth .8 to 2 in.; petioles .25 to 4 in. *Flowers* 1 in. long, few together, in axillary or terminal corymbs; their pedicels about .6 in. long, with 1 or more linear bracts at the base. *Calyx* inflated, tubular, narrowed towards the mouth, glabrous, lobes of the mouth triangular, acute, erect, the lower half of the tube attached to the ovary. *Corolla* inserted on the concave disk of the ovary, slightly exserted from the calyx, tubular, inflated towards the middle; lobes of the mouth short, lanceolate, reflexed; tube with rufous pubescence outside, glabrous within; style cylindric, glabrous, slightly exserted. *Fruit* unknown.

PERAK, at elevations of about 4,500 feet: *King's Collector* 8152; *Wray* 210; *Scortechini* 309.

## 3. VACCINIUM, Linn.

Shrubs, sometimes epiphytic. *Leaves* usually small, alternate, but sometimes in pseudo-whorls, from lanceolate to ovate, entire or serrate.

*Flowers* usually small, axillary or terminal, in racemes fascicles or corymbs rarely solitary, usually bracteate and bracteolate. *Calyx-tube* globose, its teeth 4 or 5, small. *Corolla* urceolate, tubular or ovoid, 5-lobed, pink white or greenish-yellow. *Stamens* 8 or 10, free, inserted near the base of the corolla-tube; anthers oblong, with two apical cylindric tubes dehiscing by terminal slits, sometimes appendiculate at the base (apical tubes very short in one or two species). *Disk* cushion-shaped, convex, sometimes lobed. *Ovary* 4- or 5-celled, or falsely 8-10-celled; style cylindric; stigma simple; ovules few or several in each cell. *Fruit* a more or less globose berry, crowned by the persistent calyx-lobes, 5-celled or falsely 10-celled. *Seeds* small, 1 or more in each cell, ellipsoid, compressed; testa firm, smooth.—*DISTRIB.* Species about 140, in the Northern Hemisphere or on mountain ranges in the tropics.

Leaves broadly elliptic, ovate-rotund or oblanceolate, the apex broad, sometimes minutely apiculate but never acute, very coriaceous :—

Leaves under .75 in. in length, elliptic or obovate-elliptic; corolla .3 in. long, tapering to the mouth; a small glabrous tree or bush .. .. 1. *V. Scortechinii*.

Leaves under 1 in. in length, ovate or elliptic; corolla .2 to .25 in. long, the mouth wide, truncate; an epiphytic shrub, glabrous except the scurfy branches .. .. 2. *V. microphylla*.

Leaves elliptic, their apices sub-obtuse, the base truncate or minutely cordate, 1 to 1.35 in. long; flowers enveloped in large deciduous bracts .. .. 3. *V. glabrescens*.

Leaves broadly oblanceolate or spatulate, much narrowed to the base .. .. 4. *V. viscidifolium*.

Leaves obovate-elliptic, slightly narrowed to the apex but never acuminate, coriaceous; flowers .35 in. long, in axillary racemes .. .. 5. *V. Teysmanni*.

Leaves elliptic to elliptic-oblong, sub-acute acute or acuminate :—

Leaves entire :—

Leaves glabrous :—

Leaves coriaceous :—

Leaves with 4 or 5 pairs of main-nerves; flowers .2 in. long, in axillary and terminal racemes: mouth of corolla entire or obscurely toothed; a shrub or small tree; anthers with short broad beaks .. .. 6. *V. bancanum*.

Leaves with 3 pairs of main-nerves; corolla .2 in. long; its mouth with 5 short, broad, recurved lobes; beaks of anthers truncate, shorter than the cells, epiphytic .. .. 7. *V. Kunstleri*.

Leaves sub-coriaceous, their main-nerves 3 pairs; flowers .35 in. long; beaks of anthers more than twice as long as the cells; epiphytic .. .. 8. *V. Hasseltii*.

Leaves pubescent or puberulous beneath :—

- Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate, with very long caudate acuminate apices;  
under surface pubescent or puberulous .. 9. *V. acuminatissimum*.  
Leaves serrate (sometimes faintly so) sub-coriaceous,  
glabrous; flowers .3 in. long; beaks of anthers twice  
as long as the cells .. .. 10. *V. malaccense*.

1. *VACCINIUM SCORTECHINII*, n. sp., King & Gamble. A small tree or large shrub; young branches rather thicker than a crow-quill, dark and much angled when dry, glabrous. *Leaves* small, coriaceous, elliptic or obovate-elliptic, the apex rounded, the base slightly cuneate, the edges much recurved; upper surface olivaceous-brown, shining when dry; the lower brown, dull, faintly reticulate; sparsely scaly; main-nerves a single pair, rarely 2 pairs, curving upwards, converging at their apices, faint on both surfaces; the midrib depressed on the upper surface, prominent on the lower; length .3 to .45 in.; breadth .25 to .35 in.; petiole very short. *Flowers* about .35 in. long, solitary, axillary, their pedicels less than .1 in. long, minutely bracteate at the base, pubescent like the outside of the calyx and corolla. *Calyx* campanulate, the 5 teeth triangular, acute, erect. *Corolla* about .3 in. long, cylindric, inflated below and tapering to the mouth; the lobes short, broad, blunt, erect or reflexed. *Stamens* 10, each with 2 apical truncate beaks shorter than themselves, but no basal processes; filaments longer than the anthers, hairy. *Ovary* with a flat top, 5-celled, each cell with several ovules. *Style* cylindric, nearly as long as the corolla, pubescent in its lower third, otherwise glabrous. *Fruit* globular, crowned by the inflexed calyx-lobes, tomentose, many-seeded; seeds not compressed.

PERAK: *Scortechinii*; Wray, at elevations of 6,000 and 6,700 feet, 888 and 356; King's Collector 8028.

By the fall of the leaves, in the axils of which they are produced, the flowers appear as if they were in racemes. This closely resembles *V. buxifolium* and *V. coriaceum*, Hook. fil., of which figures are given in Hook. Ic. Pl. t. 891 and 892, but this has much narrower flowers and broader leaves than either.

2. *VACCINIUM MICROPHYLLUM*, Blume Bijdr. 851. Epiphytic on tall trees; a small much-branched shrub; young branches as thick as a crow-quill, with small black deciduous scurf. *Leaves* coriaceous, ovate or elliptic, the apex and base blunt, the former sometimes with a minute apiculus; upper surface bright olivaceous and shining when dry, the lower pale-brown and dull, both faintly reticulate when dry; main-nerves usually a single pair, curving upwards from the base of the midrib and passing to near the apex a little inside the edges, depressed like the midrib on the upper surface when dry, but very faint on the lower;



length .5 to .75 in.; breadth .3 to .5 in.; petioles about .05 in. long, hairy. *Flowers* .2 to .25 in. long, axillary, usually solitary, decurved; pedicels .05 in. long, or less. *Calyx* inferior, about .2 in. across, flat, deeply divided into 5 broadly triangular, sub-acute, spreading lobes. *Corolla* glabrous, widely cylindric-campanulate, deeply cut into 5 broadly triangular acute or sub-acute erect lobes. *Stamens* 10, from the base of the corolla; anthers oblong, each with an apical process shorter than itself but with no basal appendage; filaments shorter than the anthers, curved, expanded at the base. *Ovary* superior, broad with flat apex. *Style* cylindric, as long as the corolla; stigma capitate; ovules few in each cell. *Fruit* globular, surrounded by and adherent to the calyx, .2 in. in diam. Miq. Fl. Ind. Bat. II. 1063. *Diplycosia microphylla*, Beccari, Malesia 212; Clarke in Hook. f. Fl. Br. Ind. III. 458.

MALACCA: *Griffith* (K.D.) 3484; *Maingay* (K.D.) 700; *Lobb*. PERAK, at elevations of 3,000 feet: *Wray* 470, 1105; *Scortechini* 1171; *King's Collector* 3660, 6390. KEDAH: *Ridley* 5528, 5529.—DISTRIB. Borneo, Celebes, Ternate.

3. *VACCINIUM GLABRESCENS*, n. sp., King & Gamble. Epiphytic; young branches rather thicker than a crow-quill, dark-coloured when dry, minutely pubescent. *Leaves* coriaceous, elliptic, the apex sub-obtuse, the base sub-truncate and minutely cordate; upper surface dark olivaceous-brown when dry, reticulate, smooth, shining; lower surface brown when dry, minutely pubescent like the petiole (glabrescent when old); main-nerves 3 or 4 pairs, pinnate, ascending, rather straight; length 1 to 1.35 in.; breadth .6 to 1 in.; petiole under .1 in. long. *Racemes* solitary, terminal, 3 or 4 times longer than the leaves, bearing at the base of each flower a large lanceolate pubescent deciduous bract .4 in. long and about .2 in. broad at the middle. *Fruit* sub-rotund or ellipsoid, baccate, softly and minutely pubescent, crowned by the inflexed triangular calyx-teeth, .2 in. long and .15 in. in diam., 5-celled, each cell with several angled seeds.

PERAK: *Scortechini* (without number).

4. *VACCINIUM VISCIFOLIUM*, n. sp., King & Gamble. Young branches half as thick as a goose-quill, striate and pale-brown when dry. *Leaves* very coriaceous, broadly oblanceolate or spatulate, the apex very blunt, narrowed from below the middle to the short flattened petiole, the edges slightly recurved; upper surface olivaceous when dry, the lower bright brown, both glabrous; main-nerves 2 or 3 pairs, originating from the midrib near its base, ascending, little curved, very prominent like the midrib on the upper surface but faint on the lower; length 2 to 2.75 in.; breadth .8 to 1.25 in.; petioles about .1 in. *Racemes* terminal and axillary, often forming, from the fall of the leaves, pseudo-

panicles several times longer than the leaves. *Flowers* not seen. *Fruit* on curved deflexed peduncles, .5 in. in length, globular, baccate, .2 in. in diam., crowned by the persistent disk and by the 5 minute triangular calyx-teeth, 10-celled, the cells with more than one small angled seed.

PERAK: *Scortechini* 405; *Wray*, at an elevation of 6,700 feet, 328.

VAR. *minor*, King & Gamble. Leaves only 1.2 to 1.6 in. in length, their 3 or 4 pairs of nerves not so much from the base of the midrib; racemes not much longer than the leaves; fruit only .15 in. in diam.; pedicels under .2 in. long.

PERAK, at elevations of 5,000 feet: *Scortechini* 404; *King's Collector* 8020.

5. VACCINIUM TEYSMANNI, Miq. Fl. Ind. Bat. II. 1062. A medium-sized tree; young branches somewhat thinner than a goose-quill, dark-coloured and striate when dry. *Leaves* coriaceous, broadly obovate, often almost rotund-obovate or elliptic, rarely oblanceolate, the apex obtuse or rounded, rarely retuse or sub-acute, the base cuneate and merging in the broad, sometimes glandular petiole; both surfaces glabrous and faintly reticulate, upper olivaceous when dry, shining, the lower dark-brown, the midrib broad on both; main-nerves 4 to 6 pairs, curving upwards and anastomosing freely, more prominent on the upper than on the lower surface; length 2.5 to 3.5 in.; breadth 1.25 to 2.25 in.; petiole .2 to .4 in. long. *Racemes* slender, often longer than the leaves, axillary and extra-axillary, their rachises somewhat compressed and angled, often puberulous; pedicels slender, curved, minutely bracteolate or ebracteolate at the base, .15 to .2 in. long. *Flowers* .35 in. long; their pedicels .15 in. long, decurved or not, puberulous like the outside of the calyx. *Calyx* less than .1 in. long, campanulate, with 5 acutely triangular spreading teeth. *Corolla* white, puberulous, narrowly cylindric, tapering slightly to the mouth; lobes 5, very short, spreading or reflexed. *Stamens* 8 or 10, included or sub-exserted; anthers narrowly oblong, with 2 long apical spurs, but without basal appendages, shorter than the tapering hairy filaments. *Ovary* hemispheric, deeply grooved; style as long as the corolla, grooved; stigmas 5, very short, linear. *Capsule* unknown.

PERAK: On Gunong Bubu, at elevations of 4,500 feet, *Scortechini* 428, 443; *Wray* 1117, 3909; *Curtis* 3703.—DISTRIB. Java.

6. VACCINIUM BANCANUM, Miq. Fl. Ind. Bat. Suppl. 587. A small tree; young branches twice as thick as a crow-quill, deciduously puberulous, pale and angled when dry. *Leaves* coriaceous, elliptic to elliptic-oblong, the apex sub-acute acute or acuminate, the base

cuneate; both surfaces yellowish-brown when dry and rather dull, the lower reticulate; the edges slightly recurved or not; main-nerves 4 or 5 pairs, ascending, slightly curved, faint on both surfaces; length 1 to 2·5 in.; breadth ·5 to ·8 in.; petioles ·1 in. long. *Racemes* axillary and terminal, twice as long as the leaves, their rachises puberulous, angled when dry. *Flowers* ·2 in. long; their pedicels slender, decurved, ·1 to ·2 in. long, puberulous, minutely bracteolate at the base. *Calyx* puberulous, cupular, ·15 in. across, deeply divided into 5 triangular sub-acute spreading lobes. *Corolla* ovoid or ovoid-globose, with truncate, wide, entire, wavy or obscurely toothed mouth, puberulous outside. *Stamens* 10, shorter than the corolla and inserted at its base; anthers short, broad, with 2 short, trumpet-shaped, curved apical processes, opening by wide pores, and, at the base of these processes behind, 2 curved, slender filamentous spurs; the filaments longer than the anthers, flattened, tapering from the base upwards, pubescent. *Ovary* depressed, bearing a slightly convex 10-grooved disk and many hairs. *Fruit* ·2 to ·25 in. in diam., depressed-globular, crowned by the inflexed calyx-lobes, minutely pubescent, 5-celled; seeds numerous, triangular, reticulate, shining. Clarke in Hook. f. Fl. Br. Ind. III. 454. *V. exaristatum*, Kurz in Journ. As. Soc. Beng., 1873, Pt. II. 96; 1877, Pt. II. 215; For. Fl. Burm. II. 91.

PERAK, at elevations of from 5,000 to 6,500 feet: *Wray* 328, 1528, 3912; *King's Collector* 7018. MALACCA: Mount Ophir, *Moxon*; *Maingay* (K.D.) 699.—DISTRIB. Bangka.

7. *VACCINIUM KUNSTLERI*, n. sp., King & Gamble. Epiphytic; everywhere glabrous; young branches one-third of the thickness of a goose-quill, dark and striate when dry. *Leaves* coriaceous, lanceolate or narrowly elliptic, the apex acuminate, the base much narrowed, the edges slightly recurved; both surfaces brown when dry, the upper tinged with olivaceous and reticulate; main-nerves 3 pairs, ascending, little curved, slightly prominent on the upper surface only; length 2 to 2·5 in.; breadth ·5 to ·65 in.; petioles ·1 to ·15 in. long. *Racemes* about as long as the leaves, axillary, minutely bracteolate at the base of the flowers. *Flowers* ·2 in. long, their puberulous pedicels slender, ·1 to ·15 in. long. *Calyx* cupular-campanulate, about ·05 in. long, the limb spreading, wavy, with indistinct broad lobes. *Corolla* tubular-ovoid, ·15 to ·2 in. long, the mouth with 5 broad, blunt, short recurved lobes. *Stamens* 10, slightly shorter than the corolla or as long; anthers small, oblong, each with 2 short, diverging, apical truncate processes, but with none at the base; filaments three times as long as the anthers, tapering, flattened and hairy below, cylindric above. *Ovary* 5-celled, with several ovules in each cell, depressed; disk slightly convex with radiating

grooves; style slightly exserted, hairy below; stigma small. *Fruit* globular, .2 in. in diam.

PERAK, on Maxwell's Hill, elevation 3,500 feet: *Scortechini* 39, 428; *King's Collector* 8415.

This closely resembles *V. bancanum*, Miq., but it is an epiphyte. Its leaves, moreover, are narrowly elliptic or lanceolate, and they have only 3 pairs of main-nerves. The flowers of this are puberulous, and the mouth of the corolla, instead of being entire, has 5 broad, short, recurved lobes. The apical processes on the anthers are also of a different shape from those in *V. bancanum*.

8. *VACCINIUM HASSELTII*, Miq. Ann. Mus. Lugd. Bat. I. 40. An erect shrub; young branches twice as thick as a crow-quill, dark-coloured and angled when dry, glabrous. *Leaves* elliptic to elliptic-oblong, thinly coriaceous, glabrous, the apex acuminate (often caudately so); upper surface olivaceous-brown, the lower paler; main-nerves 3 pairs, very slightly curved and erect or ascending, the lower pairs passing almost to the apex, faint but distinct on both surfaces, some of the nerves transverse, the others vertical; length 1.5 to 2.5 in.; breadth .6 to 1.25 in.; petioles .2 to .25 in. long, slender. *Racemes* axillary and terminal, usually slightly longer than the leaves, their rachises at first puberulous but ultimately glabrous, ebracteolate; flower-pedicels slender, curved or straight, about .15 in. long. *Calyx* shortly cupular, with 5 spreading, broad, sub-acute or blunt teeth. *Corolla* about .35 in. long, sub-cylindric, narrowing upwards to the mouth; the lobes 5, broad, blunt, erect or reflexed, very short, each bearing a small tuft of hairs. *Stamens* 10, as long as the corolla; anthers oblong, with 2 apical beaks more than twice as long as themselves but with no basal appendages; the filaments shorter than the beaks but longer than the anther-cells, broad and hairy at the base. *Ovary* much compressed, surmounted by a large, much corrugated disk; style as long as the corolla, tapering, boldly ridged. *Fruit* globular, smooth, glabrous, .3 in. in diam., crowned by the minute calyx-lobes. *V. bancanum*, Miq., var. *angustifolium*, Scheff.

PERAK: *King's Collector* 7515; *Derry* 3702; *Wray* 4012. PAHANG: *Ridley* 1363, 10895. JOHORE: *Ridley* 6316, 6323. SINGAPORE: *Ridley* 3030, 6316A, 8907.—DISTRIB. Bangka.

9. *VACCINIUM ACUMINATISSIMUM*, Miq. Ann. Mus. Lugd. Bat. I. 36. Epiphytic shrub, 3 to 8 feet long; young branches half as thick as a goose-quill or less, clothed with short cinereous pubescence. *Leaves* coriaceous, oblong-lanceolate to elliptic-lanceolate, the apex caudate-acuminate, the base cuneate, the edges when dry much recurved; both surfaces dark olivaceous-brown when dry: the upper



shining, faintly and minutely reticulate, glabrous except the puberulous midrib, lower surface dull, dark cinereous-puberulous, especially on the midrib and nerves; main-nerves 4 or 5 pairs, unequal, slightly curved, ascending, the second lowest pair much larger than the others and more erect, all (like the midrib) depressed on the upper surface and bold and prominent on the lower; length 3·5 to 5 in.; breadth 1 in. to 1·75 in.; petioles ·15 in. long, pubescent and with several short hispid axillary processes at their bases. *Racemes* axillary, shorter than the leaves, slender, pubescent; flower-pedicels ·1 in. long, pubescent like the calyx, minutely bracteate at the base. *Calyx* when nearly ripe ·15 in. in diam., with an ovoid-globular tube pubescent outside, the mouth with 5 triangular acute incurved lobes. *Corolla* not seen. *Seeds* several, compressed, black, pitted. *Ericacea*, Wall. Cat. 7528.

PERAK, at elevations of from 5,000 to 6,000 feet: *Wray* 1159, 1418, 2821; *Scortechini* 472; *King's Collector* 3509, 6734, 7810. SINGAPORE: *Ridley* 6235.—DISTRIB. Sumatra (*Beccari* 516), Java, Borneo.

10. *VACCINIUM MALACCENSE*, Wight in Calc. Journ. Nat. Hist. VIII. (1847) 172. An erect shrub; all parts except the inflorescence glabrous; young branches as thick as a crow-quill, angled, brown when dry. *Leaves* coriaceous, lanceolate or elliptic, the apex acuminate, the base cuneate or acuminate, the edges finely crenate-serrate; both surfaces brown when dry, the lower the paler; main-nerves 4 or 5 pairs, slightly curved, ascending, interarching within the edge, not prominent on either surface; length 1 to 2·25 in.; breadth ·6 to ·9 in.; petioles ·1 to ·15 in. long. *Racemes* axillary and terminal, longer than the leaves, many-flowered, puberulous like the pedicels and flowers; pedicels slender, curved downwards, ·15 in. long (lengthening in fruit), each with 1 concave, lanceolate, caducous bract at its base, and 1 or 2 smaller subulate bracteoles inside it. *Flowers* ·3 in. long. *Calyx* campanulate, under ·1 in. long, its lobes narrowly triangular, acuminate, spreading. *Corolla* ovoid-cylindric, slightly narrowed to the mouth; lobes of limb very short, reflexed. *Stamens* 10, shorter than the corolla; anthers with 2 apical beaks longer than themselves but with no basal processes; filaments longer than the anthers, bulbous and hairy at the base. *Ovary* depressed, the disk thick; style cylindric, ridged, a little shorter than the corolla. *Fruit* depressed-globose, glabrous, ·35 in. broad. Wight Ic. 1186; Miq. Fl. Ind. Bat. Suppl. 587; Clarke in Hook. f. Fl. Br. Ind. III. 454. *Epigynium malaccense*, Klotzsch in Linnæa, XXIV. 50.

MALACCA: *Griffith* (K.D.) 3458/1; *Maingay* (K.D.) 698; *Lobb*. SINGAPORE: *Ridley*. PAHANG: *Ridley* 1025. PERAK: *Ridley* 3605.—DISTRIB. Bangka, Java, Cochin-China.

## Order LXVI. ERICACEÆ.

Shrubs, trees, or perennial herbs. *Leaves* alternate or in pseudo-whorls, ex-stipulate, entire or serrate. *Flowers* in racemes or fascicles or solitary; pedicels bracteate and sometimes bi-bracteolate. *Flowers* regular or (in *Rhododendron*) slightly irregular, hermaphrodite, sometimes dimorphous. *Calyx* free or (in *Diplycosia*) sometimes adnate to the ovary, with 5 rarely 4 or 6, teeth or lobes. *Corolla* hypogynous, persistent or deciduous, campanulate cylindric or urceolate, with 4 or 5 (rarely 6 to 10) imbricate or contorted, rarely valvate teeth or lobes (polypetalous in *Pyrola*). *Stamens* hypogynous or slightly attached to the base of the corolla; 10, or sometimes 5, 8, or 20 (in *Diplycosia* sometimes epigynous); filaments free or united into a tube by their bases; anthers 2-celled, basi- or dorsi-fixed, dehiscing by apical pores or slits, the cells often prolonged into apical tubes, sometimes dorsally spurred. *Disk* various, annular or convex, crenate or lobed, sometimes absent. *Ovary* 5-celled (rarely 4- to 16-celled); style slender, cylindric; stigma capitate or plane, entire or shortly lobed. *Ovules* numerous, rarely few, on placentas in the inner angles of the cells or pendulous from the upper corner. *Fruit* capsular, 5-celled, many-seeded, sometimes appearing baccate from the adherence of the enlarged succulent calyx. *Seeds* many, small, angled or compressed, albuminous; the testa often loose.—DISTRIB. About 1,200, in all parts of the world.

Fruit capsular:—

Capsule 5-valved, loculicidal:—

Calyx surrounding the capsule succulent in fruit:—

Anthers with 2 horns at the apex .. .. 1. GAULTHERIA.

Anthers not horned on the apex .. .. 2. DIPLYCOSIA..

Calyx not succulent in fruit .. .. 3. PIERIS.

Capsule 5- to 20-celled, septicidal, calyx not succulent in fruit;

anthers dehiscing by pores .. .. 4. RHODODENDRON.

Fruit baccate .. .. 5. PERNETTYOPSIS.

## 1. GAULTHERIA, Linn.

Erect or procumbent shrubs, rarely epiphytic. *Leaves* coriaceous, persistent, alternate, serrate or serrulate, penni-nerved. *Flowers* small, occasionally dimorphic, in axillary or terminal racemes, or axillary and solitary, bracteate and bi-bracteolate. *Calyx* with 5 teeth or lobes, enlarged, succulent and coloured in fruit and enclosing the capsule, and often with 2 simple or connate bracteoles at its base. *Corolla* ovoid-

tubular or campanulate, greenish-white or reddish, the mouth with 5 spreading or recurved imbricate lobes. *Stamens* 10, included, attached to the base of the corolla; anthers produced at the apex into 2 tubes, and often also with 1 or 2 dorsal spurs; filaments dilated at the base, usually pilose (in some flowers the stamens small and the anthers without appendages). *Ovary* 5-celled, sometimes 5-lobed; style cylindric; stigma simple; ovules many in each cell. *Capsule* 5-celled, dehiscent loculicidally from the apex, enveloped in the succulent calyx; seeds many, minute, sub-globose, angled.—*DISTRIB.* Species about 80, mostly American, a few in the mountains of India and Malaya, a few also in Australia and New Zealand.

Leaves elliptic or oblong-elliptic, sub-acute	..	..	1. <i>G. fragrantissima</i> .
Leaves broadly ovate, caudate-acuminate	..	..	2. <i>G. leucocarpa</i> .

1. *GAULTHERIA FRAGRANTISSIMA*, Wail. in As. Research. XIII. 397, with figure. A shrub; young branches twice as thick as a crow-quill, 3-angled, glabrous, pale brown when dry. *Leaves* thickly coriaceous, elliptic or oblong-elliptic, sub-acute, the base cuneate, the edges crenate-serrate; both surfaces pale brown when dry and dull, strongly reticulate, the upper always glabrous, the lower with sparse black scales and occasionally a few scattered hairs; length 1.5 to 2.25 in.; breadth .75 to 1.2 in.; petioles .15 to .2 in. *Racemes* axillary, usually longer than the leaves, slender, many-flowered; pedicels .15 in. long, deflexed, each with a small triangular acute bract at its base and two broader connate ones above its middle. *Flowers* .2 in. long. *Calyx* campanulate, with 5 deep triangular lobes, puberulous, .05 in. long or less at first, persistent and increasing to .2 in. with age. *Corolla* .15 in. long, widely tubular, the mouth contracted and with 5 short blunt lobes. *Stamens* 10; anthers elongate, included, the apex with 2 deeply bifid apical horns; filaments flattened at the base. *Fruit* depressed-globular, with 5 deep grooves, .15 in. in diam., minutely pubescent, crowned by the long, persistent, slightly clavate, cylindric style, many-seeded. DC. Prod. VII. 593; Wall. Cat. 765; Wight Ic. 1196; Bot. Mag. t. 5984; Clarke in Hook. f. Fl. Br. Ind. III. 457. *G. fragrans*, Don Prod. 151. *G. punctata*, Blume Bijdr. 850; DC. l.c. 593; Miq. Fl. Ind. Bat. II. 1055; Kurz in Journ. As. Soc. Beng., 1877, II. 215, For. Fl. Burm. II. 92. *G. ovalifolia*, Wall. Cat. 1523. *G. Leschenaultii*, DC. l.c. 593; Wight Ill. t. 141c, and Ic. 1195. *Andromeda flexuosa*, Moon Cat. Pl. Ceyl. 35. *A. katagherensis*, Hook. Ic. Pl. t. 246. *Leucothoe* (?) *katagherensis*, DC. l.c. 606.

PERAK, on the summit of Gunong Batu Pateh: Wray 879, 1580; Scortechini 405 (in part).—*DISTRIB.* British India, Ceylon, Sumatra, Java.

2. *GAULTHERIA LEUCOCARPA*, Blume Bijdr. 856. A slender climber; young branches as thick as a crow-quill, smooth, glabrous, pale-brown when dry. *Leaves* thinly coriaceous, broadly ovate, shortly rather abruptly and sharply caudate-acuminate, the base broad, emarginate or sub-cordate; edges minutely crenate-serrate; upper surface olivaceous-brown when dry, much and boldly reticulate, the nerves minutely hairy; lower surface pale-brown, reticulate, glabrous; main-nerves 2 to 4 pairs, much curved, ascending, distinct on both surfaces; length 2 to 4 in.; breadth 1 to 2 in.; petioles .15 to .2 in. long. *Racemes* slightly supra-axillary, shorter than the leaves, their rachises compressed, glabrous or pubescent; flower-pedicels rather less than .1 in. long in flower, twice as long in fruit, each with a small ovate concave bract at its base. *Flowers* .3 in. long; their pedicels rather more than .1 in. long, deflexed, puberulous, ebracteolate. *Calyx* less than .1 in. long, puberulous, campanulate, with 5 small spreading sub-acute triangular lobes. *Corolla* sub-cylindric, widest at the base and gradually tapering to the mouth, teeth of the mouth very short, blunt, erect. *Stamens* 10; anthers linear, beaked, shorter than the densely hairy tapering filaments. *Ovary* inferior, depressed-hemispheric, crowned by a thick, very concave, marginally grooved disk; style cylindric, tapering to the apex, glabrous. *Fruit* closely adnate to the calyx-tube, 5-celled, many-seeded. Miq. Fl. Ind. Bat. II. 1056; Beccari Malesia, I. 213.

PERAK, at elevations of 5,000 to 6,700 feet: Wray 360, 1573, 4101; Scortechini 1348; King's Collector 8025.—DISTRIB. Java, Sumatra.

## 2. *DIPLYCOSIA*, Blume.

Epiphytic shrubs, glabrous or setose, evergreen. *Leaves* coriaceous, alternate, entire or ciliate-serrate. *Flowers* small, axillary, solitary, on pedicels bracteolate at the base. *Calyx* with 5 teeth or lobes, free or half superior, accrescent in fruit, with 2 basal bracteoles connate into a calyculus. *Corolla* campanulate or urceolate, with 5 slightly imbricate recurved lobes. *Stamens* 10, as long as the corolla, and inserted at its base, quite included or with the tips of the anthers exerted; anthers elongate, oblong, produced at the apex into two straight valvularly-dehiscing tubes, but without dorsal appendages. *Disk* cupular, 10-lobed. *Ovary* 5-celled; style filiform; stigma simple; ovules in the cells numerous, attached to axile placentas. *Fruit* superior or half-superior, included in the succulent accrescent calyx, 2-celled, dehiscing by 5 valves, many-seeded. *Seeds* minute, cuneate; testa lax, reticulate; albumen fleshy; embryo axile, cylindric.—DISTRIB. Species about 14, all Indian or Malayan.



Leaves 2 to 5 in. long :—

Calyx-lobes broad, blunt .. ..	1. <i>D. latifolia</i> .
Calyx-lobes triangular, acute .. ..	2. <i>D. heterophylla</i> .
Leaves 1·5 to 2 in. long .. ..	3. <i>D. erythrina</i> .

1. *DIPLYCOSIA LATIFOLIA*, Blume Bijdr. 858. A small glabrous epiphytic shrub; young branches half as thick as a goose-quill, pale and angled when dry. *Leaves* thickly coriaceous, elliptic, the apex shortly and obtusely acuminate, the base cuneate or somewhat rounded, the edges recurved; both surfaces pale yellowish-brown when dry, the upper shining, the lower dull; the midrib bold, much raised on the lower surface, slightly depressed on the upper; main-nerves 2 or 3 pairs, curving upwards, the lower pair usually longer than the others, none of them very prominent on either surface, but more so on the lower than on the upper, reticulations obsolete; length 3 to 5 in.; breadth 1·35 to 3 in.; petioles ·2 to ·3 in. long. *Flowers* ·2 in. long, in axillary fascicles of 3 or 4; their pedicels slender, ·1 to ·15 in. long, inserted 3 or 4 together on minute tubercles surrounded by several small bracts. *Calyx* cupular, ·1 in. across, with 5 broad, spreading, obtuse, ciliolate lobes. *Corolla* ·25 in. long, narrowly campanulate, contracted into a short tube at the base, the limb deeply divided into 5 ovate sub-acute lobes, closely embracing the ovary. *Stamens* 10, included; anthers narrowly oblong, each with two short apical truncate beaks but no basal processes; the filaments slender in their upper halves, the lower halves dilated and cohering into a tube. *Ovary* 5-celled, the apex broad, concave; style cylindric, about as long as the corolla; stigma small, capitate. *Fruit* 5-celled; seeds numerous, elongate, black, closely enveloped by the persistent corolla. Miq. Fl. Ind. Bat. II. 1055.

PERAK, at elevations of 6,700 feet: *Wray* 364, 909, 2204; *Scortechini* 339; *King's Collector* 6797, 8023. SELANGOR: *Ridley* 7556.—  
DISTRIB. Java.

2. *DIPLYCOSIA HETEROPHYLLA*, Blume Bijdr. 858. A shrub; young branches as thick as a crow-quill, coarsely rusty-pilose at first, afterwards sub-glabrous, when dry pale and angled. *Leaves* coriaceous, elliptic oblong-elliptic or lanceolate, acute or acuminate at apex and base, the edges recurved; both surfaces olivaceous-brown when dry, the upper sub-reticulate and shining, the lower dull and not reticulate; main-nerves 1 pair following the edge from base to apex, distinct and depressed like the midrib on the upper surface, indistinct on the lower; length 2 to 4 in.; breadth 1 to 2 in.; petiole rather more than ·2 in. long. *Flowers* axillary, fascicled, rarely solitary, about ·15 in. long, bearing under the calyx 2 broadly reniform, acute, spreading concave bracts.

*Calyx* campanulate, with 5 broadly triangular erect lobes, closely applied to the fruit. *Corolla* widely campanulate, .2 in. long, the teeth 5, broad, blunt, short, reflexed. *Fruit* superior, sub-rotund, smooth, many-seeded, crowned by the fluted style; seeds oblong, concave, compressed, numerous.

PERAK: *Scortechini*.

3. *DIPLYCOSIA ERYTHRINA*, King & Gamble. A small tree, 10 to 20 feet high; young branches twice as thick as a crow-quill, glabrous, pale-brown when dry, angled. *Leaves* thickly coriaceous, elliptic, the apex obtuse or sub-acute, the base acute, the edges recurved; both surfaces when dry pale-brown, the upper tinged with olivaceous, not reticulate, quite glabrous; main-nerves 2 to 3 pairs, ascending, rather straight, faint on both surfaces; length 1.5 to 2 in.; breadth .75 to 1 in.; petioles .1 in. long, stout. *Racemes* terminal, nearly twice as long as the leaves, with a large narrowly elliptic leaf-like bract .4 to .6 in. long, and .1 to .2 in. broad at the base of each flower-pedicel; pedicels decurved, .15 in. long in the flower, rather more than twice as long in the fruit. *Flowers* .4 in. long. *Calyx* .2 in. long, campanulate, with 5 spreading triangular acute lobes. *Corolla* .35 in. long, cylindric, narrowed towards the throat, glabrous; the mouth with 5 short, broad, blunt, recurved lobes. *Stamens* 10, slightly exserted; anthers broadly oblong, with neither apical nor basal appendages; the filaments three times as long, broadening towards the base, pubescent. *Ovary* inferior, its disk convex, hairy; style slightly exceeding the corolla, cylindric; stigma small, capitate. *Fruit* oblong-globose, .2 in. in diam., surmounted by the inflexed calyx-lobes, sub-glabrous, pericarp leathery; cells 5, each with several angular seeds. *Vaccinium erythrinum*, Hook. Bot. Mag. t. 4688.

PERAK, at elevations of 5,000 feet: *Wray* 3816; *King's Collector* 7349; *Scortechini*.—DISTRIB. Java, Sumatra.

### 3. *PIERIS*, D. Don.

Trees or shrubs, with terete branchlets. *Leaves* alternate, petiolate, entire or serrulate, persistent. *Racemes* axillary and solitary, or terminal and in panicles; pedicels bracteate and also with 1 or 2 bracteoles. *Calyx* free, with 5 teeth or lobes; the segments in bud open or valvate. *Corolla* ovoid or elongate-urceolate, with 5 short recurved teeth, white. *Stamens* 10; anther-cells ovoid-truncate; filaments each with 2 divaricate horns from its apex or ex-appendiculate. *Ovary* globose with a lobed disk, 5-celled; ovules numerous; style cylindric; stigma capitellate or truncate. *Capsule* globose, dry, 5-celled, with 5-valved loculicidal dehiscence. *Seeds* many, linear-oblong, falcate, not

winged, albuminous; testa loose.—DISTRIB. Species 10; Himalaya and the mountains of Burma and of the Malayan Peninsula.

*PIERIS OVALIFOLIA*, D. Don in Edinb. Phil. Journ. XVII. (1834) 159. A tree; young branches whitish-puberulous at first, afterwards black and glabrous, about a third as thick as a goose-quill. *Leaves* thinly coriaceous, ovate, shortly acuminate, the base broad and rounded, the edges very slightly recurved; upper surface blackish-brown when dry, glabrous, the lower of a paler brown, minutely reticulate, puberulous on the midrib and nerves; main-nerves 12 to 15 pairs, spreading, curving slightly upwards, sharply prominent on the lower surface, indistinct on the upper; length 4 to 5.25 in.; breadth 2 to 2.75 in.; petiole .25 to .3 in. long, puberulous. *Racemes* simple, axillary, 4 to 10 in. long, sometimes by suppression of the leaves forming a terminal false panicle, more or less pubescent; bracts .2 in. long, linear or lanceolate. *Calyx-teeth* connate at the base. *Corolla* narrowly ovoid, white. *Capsule* globose, glabrous, .2 in. in diam. *Seeds* small, linear-oblong. DC. Prod. VII. 599; Loudon, Arb. Brit. 570, fig. 1070; Clarke in Hook. f. Fl. Br. Ind. III. 460. *Andromeda ovalifolia*, Wall. Cat. 763, and in Asiat. Research, XIII. 391 (with fig.); Don Prod. 148; Wight Ic. t. 1199; Brandis For. Flora, 280; Kurz in Journ. As. Soc. Beng., 1877, Pt. II. 216, For. Fl. Burm. II. 192. *A. elliptica*, Sieb. & Zucc. Fl. Jap. Fam. Nat. II. 126. *Thibaudia*, Griff. Ic. Pl. Asiat. t. 514.

PERAK, at an elevation of 5,000 feet: Wray 1522.—DISTRIB. Himalaya up to 8,000 ft.; Khasia Hills; Burma; Japan.

#### 4. RHODODENDRON, Linn.

Shrubs or trees, often aromatic often scaly. *Leaves* coriaceous, entire, alternate, rarely sub-opposite or in false whorls, often clustered near the ends of the branches. *Flowers* in terminal fascicles or pseudocorymbs, rarely solitary or axillary; bracts broad, usually caducous, bracteoles linear. *Calyx* persistent, 5-lobed, rarely cupular, sometimes small or obsolete. *Corolla* campanulate, salver-shaped or funnel-shaped, the tube long or short, the limb 5- to 10-lobed. *Stamens* usually 10 but sometimes 5 or 18; anthers oblong, dehiscing by terminal pores. *Ovary* 5- to 20-celled; style long or short, filiform; stigma capitate; ovules numerous in each cell. *Capsule* short or elongate, always woody, 5- to 20-celled, septicidally dehiscent, the valves separating from the placentas from above downwards. *Seeds* numerous, ellipsoid, albuminous, the testa often crested or tailed at one end or at both.—DISTRIB. Species about 160, in mountainous parts of Europe, Asia, and North America.

Corolla widely campanulate, tubular only at the base:—

All parts glabrous, leaves not glaucous and without scales;

capsule 1 to 1·5 in. long .. .. 1. *R. javanicum*.

Lower surfaces of leaves glaucous, the nerves and reticulations hairy; capsule ·5 in. long .. .. 2. *R. Wrayi*.

Corolla narrowly campanulate or funnel-shaped, the tube inflated upwards and passing gradually into the limb; flowers

·35 to ·85 in. long:—

Leaves obovate, ·6 to ·8 in., and rarely as much as 1 in. long:—

All parts glabrous except the inflorescence .. .. 3. *R. pauciflorum*.

All parts more or less scaly .. .. 4. *R. perakense*.

Leaves elliptic to elliptic-rotund, from 1·25 to 2 in. long .. .. 5. *R. Scortechinii*.

Corolla salver-shaped, the tube much longer than the limb:—

Tube of corolla from 1·25 to 1·6 in. long, and about ·15 in. in diam. from base to apex; leaves sub-sessile, whorled, sparsely

scaly or glabrous .. .. 6. *R. jasminiflorum*.

Tube of corolla 2 in. long, ·25 in. wide near the base, widening to ·4 in. or more near the mouth; petioles ·35 to ·5 in. long .. .. 7. *R. longiflorum*.

Tube of corolla ·6 in. long and about ·2 in. in diam.; petioles ·4 to ·6 in. long .. .. 8. *R. malayanum*.

Species imperfectly known .. .. 9. *R. dubium*.

1. RHODODENDRON JAVANICUM, Benn. Pl. Jav. Rar. p. 85, t. 19. An epiphytic shrub, 3 to 8 feet long; all parts glabrous, esquamose; young branches rather thinner than a goose-quill. *Leaves* thinly coriaceous, elliptic or elliptic-oblong, tapering to the acute apex and base; both surfaces brown when dry (the lower rather the lighter), shining, the midrib very prominent; main-nerves about 8 or 10 pairs, interarching rather far from the edge, faint on the upper surface, obsolete on the lower, the intermediate nerves almost as prominent; length 3·5 to 5·5 in.; breadth 1·25 to 2 in.; petioles ·3 to ·75 in. long. *Umbels* terminal, 5- to 7-flowered, enveloped in bud in broadly ovate apiculate bracts; pedicels ·5 to 1·5 in.; bracteoles linear. *Calyx* cupular, less than ·1 in. deep, the mouth wavy. *Corolla* red, widely campanulate, 1·25 to 1·5 in. long; the tube widely funnel-shaped, cylindric at the base; the limb 1·25 to 1·5 in. wide, with 5 large, broad, blunt spreading lobes. *Stamens* 10, shorter than the corolla-limb; the filaments slender; the anthers oblong. *Ovary* glabrous or slightly scaly (hairy in var. *Teysmanni*); style shorter than the stamens, clavate, hemispheric. *Capsule* narrowly cylindric, 1 to 1·5 in. long, and only ·25 in. in diam., glabrous, slightly ridged, crowned by the whole or part of the style. DC. Prod. VII. 721; Bot. Mag. t. 4366; Fl. des Serres (1847), t. 293; Miq. Fl. Ind. Bat. II. 1057; Miq. in Ann. Mus. Lugd. Bat. I. 42, t. 1b; Clarke in Hook. f. Fl. Br. Ind. III. 463. *Vireya javanica*, Blume Bijdr. II. 854.

MALAY PENINSULA: Lobb and others. PENANG: Ridley 129.



KEDAH: Derry 5531. PERAK: *Scorteckini* 373, 1325; Derry 3705; Fox 129; King's Collector 2335, 3672, 6916, 7008; Wray 1023. SINGAPORE: Ridley.—DISTRIB. Sumatra, Java, Celebes.

VAR. *Teysmanni*, King & Gamble. Ovary densely hairy; filaments hairy near the base, corolla yellow. *R. Teysmanni*, Miq. Fl. Ind. Bat. Suppl. 585; Clarke in Hook. f. Fl. Br. Ind. III. 463.

PENANG: Maingay (K.D.) 1099, 10257; Curtis 530. PERAK: Wray 601, 623; King's Collector 3672.—DISTRIB. Sumatra, Java.

2. *RHODODENDRON WRAYI*, n. sp., King & Gamble. A bush; young branches as thick as a goose-quill, at first sparsely scaly, ultimately glabrous. Leaves very coriaceous, elliptic or sub-obovate-elliptic, the apex sub-acute, the base rounded, the edges recurved when dry; upper surface dark-brown when dry, glabrous, the midrib much depressed; lower surface white, glaucous, with short hairs on the minute reticulations, the main-nerves, and the bold midrib; main-nerves 6 to 12 pairs, spreading, curved, rather dark-coloured and conspicuous on the lower surface, invisible on the upper; length 1.75 to 3.5 in.; breadth .85 to 1.5 in.; petioles .4 to .8 in. long, stout, scaly. Umbels terminal, 8- to 12-flowered, unequal, .5 to .75 in. long, scaly. Flower-buds enveloped in obovate-oblong apiculate bracts, the inner tomentose externally, the outer glabrous, all deciduous. Calyx cupular, 5-toothed, less than .1 in. deep. Corolla glabrous, white, tinged with pale pink and spotted in the throat, widely campanulate from a tubular base, about 1.25 in. long, and rather more in breadth at the mouth; lobes of the limb 5, broadly ovate, spreading. Stamens 10; filaments shorter than the corolla, glabrous; anthers oblong. Ovary hairy; style glabrous, longer than the stamens; stigma hemispheric, lobed. Capsule only .5 in. long and about half as much in diam., not apiculate, tomentose, ridged, 5-celled.

PERAK, at from 3,500 to 7,000 feet: Wray 322, 886, 1569; *Scorteckini*.

3. *RHODODENDRON PAUCIFLORUM*, n. sp., King & Gamble. A small shrub, all parts except the inflorescence glabrous; young branches as thick as a crow-quill, smooth. Leaves coriaceous, obovate, rarely rotund-obovate, the apex broad, usually minutely retuse, the base much narrowed, the edges recurved; upper surface olivaceous, the lower brown when dry; the midrib stout and prominent on the lower surface, depressed on the upper (when dry); main-nerves 3 or 4 pairs, indistinct on both surfaces; length .6 to 1 in.; breadth .4 to .65 in.; petioles less than .1 in. long. Flowers 1 or 2, terminal; their pedicels pubescent, .25 to .6 in. long, with 1 or 2 loose sheathing deciduous bracts at their bases. Calyx cupular, about .1 in. long, obscurely toothed. Corolla

bright red, infundibuliform-campanulate, .2 to .3 in. wide at the throat and from .5 to .85 in. long; the limb spreading, .5 to .75 in. across, divided into 5, broad, blunt lobes, the tube .35 to .5 in. long. *Capsule* unknown.

PERAK, on Gunong Batu Patch at an elevation of 4,500 feet: Wray 231; *Scortechinii* 345B.

4. RHODODENDRON PERAKENSE, n. sp., King & Gamble. Epiphytic; a small shrub with very scaly young branches as thick as a crow-quill. *Leaves* very coriaceous, obovate or broadly oblanceolate, obtuse, much narrowed to the base, the edges recurved; upper surface olivaceous when dry, at first with a few large scales but ultimately glabrous, reticulate, the midrib depressed; lower surface dark brown, with persistent large dark scales in pits, the midrib very thick and prominent; main-nerves 2 (rarely 3) pairs, spreading, very prominent on the under surface, and, like the midrib, with persistent large dark scales; length .6 to .8 in.; breadth .3 to .4 in.; petioles about .1 in. long. *Umbels* terminal, 3- to 5-flowered, covered in bud by broad rounded deciduous bracts with ciliate edges; pedicels .25 to .3 in. long, slightly scaly. *Flowers* .35 to .4 in. long. *Calyx* shallow, cupular, its edges wavy. *Corolla* bright yellow, narrowly campanulate, the mouth with broad, slightly spreading lobes. *Stamens* not exserted; filaments glabrous, anthers short. *Ovary* sub-glabrous; style not exserted; stigma clavate, truncate. *Capsule* .3 in. long, dehiscing by 5 straight untwisted valves.

PERAK, at an elevation of 7,000 feet: Wray 1574.

5. RHODODENDRON SCORTECHINII, n. sp., King & Gamble. Shrubby, epiphytic or terrestrial, when the latter sometimes sub-arboreous; young branches half as thick as a goose-quill, smooth, terete. *Leaves* very coriaceous, elliptic to elliptic-rotund or obovate, the apex obtuse and sometimes faintly notched, the base cuneate, the edges recurved; upper surface dark olivaceous-brown when dry, glabrous, shining, depressed-reticulate; lower surface of a uniform warm brown, not reticulate, pitted and minutely scaly; main-nerves 4 to 6 pairs, spreading, depressed on the upper surface, and raised on the lower (sometimes very much so); midrib much depressed on the upper surface and prominent on the lower (when dry); length 1.25 to 2 in.; breadth .75 to 1.25 in.; petioles .1 to .15 in. long, scaly. *Umbels* terminal, 4- to 7-flowered; the pedicels unequal, .5 to 1 in. long (longer in fruit). *Flowers* about .75 in. long. *Calyx* short, cupular, with many rounded teeth. *Corolla* yellow (sometimes very pale), .75 in. long, widely funnel-shaped, the mouth about .6 in. across, with 5 deep, broadly ovate, slightly spreading lobes, the outer surface with many dark-

coloured scales. *Stamens* about 8, slightly or not at all exserted; filaments glabrous; anthers elliptic, small. *Ovary* scaly; *style* slightly exserted, glabrous; *stigma* clavate-hemispheric, lobed. *Capsule* 5 in. long, scaly, shortly apiculate, 5-valved, the valves not twisted in dehiscence.

PERAK, at elevations of 5,000 to 7,000 feet: *Scortechini* 401B, 753; *Wray* 311, 1572, 3840; *Cantley*.

6. RHODODENDRON JASMINIFLORUM, Hook. Bot. Mag. t. 4524. Usually epiphytic; a small shrub, only a few feet high; young branches somewhat less than half as thick as a goose-quill, glabrous. *Leaves* in whorls, thickly coriaceous, almost sessile, broadly elliptic to elliptic-rotund, the apex acute, the base rounded and minutely cordate; upper surface when dry pale olivaceous-brown, sometimes with a few small loose scales, the 5 to 7 pairs of spreading main-nerves slightly distinct and (like the midrib) depressed; the lower darker brown, not olivaceous, the nerves very faint but the midrib pale and prominent; length 1.25 to 3 in.; breadth 1 to 1.5 in.; petiole .1 in. long. *Umbels* terminal, 8- to 20-flowered; the pedicels filiform, .75 to 1 in. long, scaly and hairy; bracteoles membranous, broad, glabrous, .25 to .5 in. long. *Calyx* a shallow toothed cup, less than .1 in. deep. *Corolla* white, salver-shaped; the tube narrowly cylindric, sparsely scaly or glabrous outside, about .15 in. in diam. and 1.25 to 1.6 in. long (when dry); the limb one-third as long, spreading, with 5 deep, broad, obovate-obtuse or rotund lobes. *Stamens* 10, the filaments shortly exserted, thin, pubescent; anthers short, broad. *Ovary* 5-celled, pubescent; style longer than the corolla-tube, pubescent; stigma depressed-capitate, grooved. *Capsule* about .75 to 1 in. long, narrowly sub-cylindric, much apiculate, ridged, its valves recurved to the base and often twisted. Lemaire, *Jard. Fleur.* t. 41; *Illust. Hort.* (1859) t. 203; Clarke in Hook. f. *Fl. Br. Ind.* III. 463; *Miq. Fl. Ind. Bat.* II. 1059.

MALACCA, on Mount Ophir: *Griffith* (K.D.) 3504; *Maingay* (K.D.) 701; *Ridley*. PERAK: *Wray* 1635; *Scortechini*; *King's Collector* 3586, 3645, 6909; *Ridley* 124.—DISTRIB. Java, Sumatra.

7. RHODODENDRON LONGIFLORUM, Lindl. in *Journ. Hort. Soc.* III. 88 with figure. Epiphytic; 3 to 6 feet high; young branches half as thick as a goose-quill, densely scaly like the petioles. *Leaves* coriaceous, usually elliptic-oblong, sometimes elliptic or oblanceolate, sub-acute or acute, much narrowed to the base; upper surface when dry olivaceous-brown, coarsely and widely reticulate with broad black scales, especially on the depressed midrib, the 5 to 7 pairs of spreading main-nerves faint; lower surface brown, uniformly covered with black deciduous scales, ultimately glabrous; the main-nerves indistinct but the midrib

stout and prominent; length 2.25 to 3.5 in.; breadth .8 to 1.5 in.; petioles .35 to .5 in. long, stout. *Umbels* terminal, 5- to 7-flowered; flower-pedicels .5 to .8 in. long, scaly or glabrous. *Flowers* about 2 in. long, glabrous outside, narrowly sub-campanulate, almost salver-shaped. *Calyx* small, cupular, with wavy edges, under .05 in. deep. *Corolla* red, infundibuliform; its tube about .25 in. wide near the base but expanding gradually to about .4 in. or more near the mouth, about three times as long as the broadly bluntly 5-lobed limb. *Stamens* 10, the filaments slender, pubescent, slightly exserted; anthers short, blunt. *Ovary* densely hairy like the style; stigma clavate. *Capsule* unknown. Fl. des Serres, V. p. 477-480f.

PERAK: *Scortechini* 385, 553, 1409; *King's Collector* 1864, 5181.—  
DISTRIB. Borneo, Sumatra.

8. RHODODENDRON MALAYANUM, Jack in Mal. Misc. II. n. 7, 17. An erect straggling shrub, 3 to 15 feet high, all parts more or less glandular and scaly; young branches less than half as thick as a goose-quill. *Leaves* narrowly elliptic or lanceolate, the apex and base acute or sub-acute, the edges recurved when dry; upper surface shining, glabrous, and olivaceous when dry, the 5 to 8 pairs of main-nerves faint, slightly depressed, the midrib much depressed and often scaly; the lower of a deep uniform brownish-cinereous colour and with numerous dark scales, the nerves obsolete but the midrib bold and prominent; length 1.75 to 3.25 in.; breadth .75 to 1.25 in.; petioles .4 to .6 in. long, covered with large black scales. *Umbels* terminal, 3- to 5-flowered. *Flowers* .8 in. long, their pedicels .25 to .35 in. long, slender, scaly. *Calyx* cupular, 5-toothed, less than .05 in. deep. *Corolla* red, glabrous, .8 in. long (when dry), salver-shaped, the tube about .2 in. in diam. when dry, about .6 in. long, the limb about .5 in. across when dry, with 5 broad, blunt, cuneate lobes. *Stamens* 10, their filaments glabrous. *Ovary* 5-celled; style slightly exserted from the throat of the corolla, glabrous; stigma clavate. *Capsule* about 1 in. long, slender, ridged, the valves much recurved, twisted. Hook. Journ. Bot. I. 369; DC. Prod. VII. 725; Bot. Mag. t. 6045; Beccari Malesia, I. 205; Clarke in Hook. f. Fl. Br. Ind. III. 463. *R. tubiflorum* and *R. celebicum*, DC. l.c. 725; Miq. in Ann. Mus. Lugd. Bat. I. 44, t. 2AB; Fl. Ind. Bat. II. 1059. *R. lampongum*, Miq. Fl. Ind. Bat. Suppl. 585. *Vireya tubiflora* and *V. celebica*, Blume Bijdr. 855, 854.

MALACCA: on Mount Ophir, 4,000 ft., *Griffith* (K.D.) 3503; *Maingay* (K.D.) 702; *Wray*; *Kurz*. PERAK: *Scortechini* 385, 2336; *Wray* 614; *King's Collector* 3227, 8076. PENANG: *Ridley* 125. SELANGOR: *Ridley* 7557.—DISTRIB. Sumatra, Java.

9. RHODODENDRON DUBIUM, n. sp., King & Gamble. A shrub or small



tree; young branches rather thinner than a goose-quill, pale brown when dry, slightly pubescent. *Leaves* coriaceous, glabrous, oblong-elliptic, the apex sub-acute, narrowed from about the middle to the acute or rounded base; both surfaces dull brown when dry and minutely reticulate, the lower pale; main-nerves 15 to 18 pairs, slightly curved, spreading, indistinct on the upper surface, rather distinct on the lower; the midrib very bold and prominent on the lower surface, faint and depressed on the upper; length 3.5 to 6 in.; breadth 1 to 2 in.; petiole .75 to 1 in. long, stout. *Umbels* shortly stalked, 3- to 8-flowered; flower-pedicels unequal, .75 to 1.35 in. long, stout, glabrous. *Flowers* unknown. *Calyx* cupular, .1 in. deep, the mouth wavy. *Ovary* densely rufescent-pubescent. *Capsule* .4 to .7 in. long, rusty-pubescent, very slightly ridged, dehiscing by 5 straight valves, crowned by the persistent pubescent style.

PERAK, at an elevation of 3,400 feet: Wray 233, 460: *Scortechini* 367.

#### 5. *PERNETTYOPSIS*, King & Gamble, nov. gen.

Small rigid epiphytic shrubs. *Leaves* alternate, on short hispid petioles, minutely sub-crenulate, coriaceous, persistent. *Flowers* solitary or in pairs, axillary, with 2 (rarely 3) rather large bracts at their bases forming an involucre; pedicels decurved in fruit. *Calyx* larger than the corolla, rotate, deeply 5-partite, persistent and unchanged in fruit. *Corolla* urceolate or ovoid, glabrous, the mouth constricted and with 5 short reflexed teeth. *Stamens* 10, free, included, the filaments slightly attached by their somewhat dilated bases to the bottom of the corolla-tube. *Anthers* short, inappendiculate at the back or base, oblong, the apices prolonged into 2 long porously dehiscing tubes. *Ovary* faintly 5-lobed, 5-celled; style columnar; stigma simple; ovules numerous, the placentas on the inner angles of the loculi. *Berry* globose, 5-celled. *Seeds* minute, compressed, numerous, angled; testa crustaceous.—*DISTRIB.* Species 2, both Malayan.

Calyx densely rusty-tomentose .. .. .	1. <i>P. malayana</i> .
Calyx glabrous except the tips of the lobes .. .. .	2. <i>P. sub-glabra</i> .

1. *PERNETTYOPSIS MALAYANA*, n. sp., King & Gamble. Epiphytic; a bush a foot or two in height; young branches half as thick as a goose-quill, sparsely clothed near their apices with flat adpressed black bristles less than .1 in. long. *Leaves* thickly coriaceous, rotund, obovate to elliptic, the apex broad, minutely apiculate, the base slightly narrowed; upper surface olivaceous-brown when dry, shining, the midrib and main-nerves deeply depressed, the reticulations less so; lower

stout and prominent; length 2.25 to 3.5 in.; breadth .8 to 1.5 in.; petioles .35 to .5 in. long, stout. *Umbels* terminal, 5- to 7-flowered; flower-pedicels .5 to .8 in. long, scaly or glabrous. *Flowers* about 2 in. long, glabrous outside, narrowly sub-campanulate, almost salver-shaped. *Calyx* small, cupular, with wavy edges, under .05 in. deep. *Corolla* red, infundibuliform; its tube about .25 in. wide near the base but expanding gradually to about .4 in. or more near the mouth, about three times as long as the broadly bluntly 5-lobed limb. *Stamens* 10, the filaments slender, pubescent, slightly exserted; anthers short, blunt. *Ovary* densely hairy like the style; stigma clavate. *Capsule* unknown. Fl. des Serres, V. p. 477-480f.

PERAK: *Scortechini* 385, 553, 1409; *King's Collector* 1864, 5181.—

DISTRIB. Borneo, Sumatra.

8. RHODODENDRON MALAYANUM, Jack in Mal. Misc. II. n. 7, 17. An erect straggling shrub, 3 to 15 feet high, all parts more or less glandular and scaly; young branches less than half as thick as a goose-quill. *Leaves* narrowly elliptic or lanceolate, the apex and base acute or sub-acute, the edges recurved when dry; upper surface shining, glabrous, and olivaceous when dry, the 5 to 8 pairs of main-nerves faint, slightly depressed, the midrib much depressed and often scaly; the lower of a deep uniform brownish-cinereous colour and with numerous dark scales, the nerves obsolete but the midrib bold and prominent; length 1.75 to 3.25 in.; breadth .75 to 1.25 in.; petioles .4 to .6 in. long, covered with large black scales. *Umbels* terminal, 3- to 5-flowered. *Flowers* .8 in. long, their pedicels .25 to .35 in. long, slender, scaly. *Calyx* cupular, 5-toothed, less than .05 in. deep. *Corolla* red, glabrous, .8 in. long (when dry), salver-shaped, the tube about .2 in. in diam. when dry, about .6 in. long, the limb about .5 in. across when dry, with 5 broad, blunt, cuneate lobes. *Stamens* 10, their filaments glabrous. *Ovary* 5-celled; style slightly exserted from the throat of the corolla, glabrous; stigma clavate. *Capsule* about 1 in. long, slender, ridged, the valves much recurved, twisted. Hook. Journ. Bot. I. 369; DC. Prod. VII. 725; Bot. Mag. t. 6045; Beccari Malesia, I. 205; Clarke in Hook. f. Fl. Br. Ind. III. 463. *R. tubiflorum* and *R. celebicum*, DC. l.c. 725; Miq. in Ann. Mus. Lugd. Bat. I. 44, t. 2AB; Fl. Ind. Bat. II. 1059. *R. lampongum*, Miq. Fl. Ind. Bat. Suppl. 585. *Vireya tubiflora* and *V. celebica*, Blume Bijdr. 855, 854.

MALACCA: on Mount Ophir, 4,000 ft., *Griffith* (K.D.) 3503; *Maingay* (K.D.) 702; *Wray*; *Kurz*. PERAK: *Scortechini* 385, 2336; *Wray* 614; *King's Collector* 3227, 8076. PENANG: *Ridley* 125. SELANGOR: *Ridley* 7557.—DISTRIB. Sumatra, Java.

9. RHODODENDRON DUBIUM, n. sp., King & Gamble. A shrub or small

tree; young branches rather thinner than a goose-quill, pale brown when dry, slightly pubescent. *Leaves* coriaceous, glabrous, oblong-elliptic, the apex sub-acute, narrowed from about the middle to the acute or rounded base; both surfaces dull brown when dry and minutely reticulate, the lower pale; main-nerves 15 to 18 pairs, slightly curved, spreading, indistinct on the upper surface, rather distinct on the lower; the midrib very bold and prominent on the lower surface, faint and depressed on the upper; length 3.5 to 6 in.; breadth 1 to 2 in.; petiole .75 to 1 in. long, stout. *Umbels* shortly stalked, 3- to 8-flowered; flower-pedicels unequal, .75 to 1.35 in. long, stout, glabrous. *Flowers* unknown. *Calyx* cupular, .1 in. deep, the mouth wavy. *Ovary* densely rufescent-pubescent. *Capsule* .4 to .7 in. long, rusty-pubescent, very slightly ridged, dehiscing by 5 straight valves, crowned by the persistent pubescent style.

PERAK, at an elevation of 3,400 feet: *Wray* 233, 460: *Scortechini* 367.

5. *PERNETTYOPSIS*, King & Gamble, nov. gen.

Small rigid epiphytic shrubs. *Leaves* alternate, on short hispid petioles, minutely sub-crenulate, coriaceous, persistent. *Flowers* solitary or in pairs, axillary, with 2 (rarely 3) rather large bracts at their bases forming an involucre; pedicels decurved in fruit. *Calyx* larger than the corolla, rotate, deeply 5-partite, persistent and unchanged in fruit. *Corolla* urceolate or ovoid, glabrous, the mouth constricted and with 5 short reflexed teeth. *Stamens* 10, free, included, the filaments slightly attached by their somewhat dilated bases to the bottom of the corolla-tube. *Anthers* short, inappendiculate at the back or base, oblong, the apices prolonged into 2 long porously dehiscing tubes. *Ovary* faintly 5-lobed, 5-celled; style columnar; stigma simple; ovules numerous, the placentas on the inner angles of the loculi. *Berry* globose, 5-celled. *Seeds* minute, compressed, numerous, angled; testa crustaceous.—*DISTRIB.* Species 2, both Malayan.

Calyx densely rusty-tomentose .. .. .	1. <i>P. malayana</i> .
Calyx glabrous except the tips of the lobes .. .. .	2. <i>P. sub-glabra</i> .

1. *PERNETTYOPSIS MALAYANA*, n. sp., King & Gamble. Epiphytic; a bush a foot or two in height; young branches half as thick as a goose-quill, sparsely clothed near their apices with flat adpressed black bristles less than .1 in. long. *Leaves* thickly coriaceous, rotund, obovate to elliptic, the apex broad, minutely apiculate, the base slightly narrowed; upper surface olivaceous-brown when dry, shining, the midrib and main-nerves deeply depressed, the reticulations less so; lower



surface pale dull-brown, with sparse pits, each bearing a short adpressed dark hair, the edges wavy, sub-serrate and adpressed-ciliate; main-nerves 2 or 3 pairs, curving upwards and inwards and interarching, thick but faint on the lower surface; length 1.25 to 2 in.; breadth .75 to 1.35 in.; petioles .1 to .2 in., adpressed-bristly. *Flowers* solitary or in pairs, .4 or .5 in. long, axillary, pedicellate, the pedicels .3 to .4 in. long, twice as long (or more) in fruit, densely rusty-tomentose and recurved when young, erect and less woolly when old. *Involucral bracts* usually 2, thick, about .2 in. long, broad, glabrous inside, rusty-tomentose outside. *Calyx* larger than corolla, rotate, deeply divided into 5 lanceolate, somewhat spreading, lobes; rusty-tomentose outside and sub-glabrous inside. *Corolla* a little shorter than the calyx, glabrous, ovoid-globular, its mouth contracted and with 5 short reflexed teeth. *Stamens* 10, shorter than the corolla, and inserted near its base; *anthers* oblong, broad, cordate and inappendiculate at the base; the apex prolonged into 2 white apically porous tubes; filaments short, bent. *Ovary* sub-globular, laxly and deciduously tomentose, 5-celled; ovules numerous, oblong-concave, attached by the middle to the axillary placentas; style cylindric, slightly grooved, twice as long as the corolla. *Fruit* a berry with scanty pulp, blue when ripe, the seeds red.

PERAK, at elevations of about 6,500 feet, on the summit of Gunong Batu Pateh: *Scortechini* 402; *Wray* 312.

2. *PERNETTYOPSIS SUB-GLABRA*, n. sp., King & Gamble. A small, rigid, epiphytic shrub; young stems slightly thicker than a crow-quill, with a few adpressed bristles near the ends, otherwise glabrous. *Leaves* coriaceous, sub-rotund to elliptic-rotund, minutely apiculate; upper surface dull-brown, minutely reticulate, glabrous, the lower reddish-brown, with a few small adpressed hairs with black bases; main-nerves 3 or 4 pairs, curving upwards, deeply depressed on the upper surface like the midrib, less so on the lower; the edges minutely sub-serrate and sparsely adpressed-ciliate; length .8 to 1.5 in.; breadth .75 to 1.25 in.; petiole .15 to .25 in. long, adpressed-bristly. *Bracts* under the flower 2 or 3, broad, rusty-pubescent externally like the pedicel. *Calyx* longer than the corolla, rotate, with 5 deep lanceolate spreading lobes, glabrous except the rusty-pubescent tips. *Corolla*, stamens, ovary, and style as in *P. malayana*. *Fruit* unknown.

PERAK, at elevations of 5,000 feet: *Scortechini* 752; *King's Collector* 7407.



## Order LXVII. MONOTROPEÆ.

[By D. PRAIN.]

Leafless, erect, white or coloured root-parasites; stems herbaceous, scaly, simple or forked. *Flowers* solitary on the stem or branches, regular, hermaphrodite. *Sepals* usually resembling the scales, 2 to 6, often deciduous. *Petals* 3 to 6. *Stamens* 6 to 12, hypogynous, 2-seriate; filaments filiform or flattened; anthers 2-celled, or by confluence 1-celled. *Ovary* superior, globose or fusiform, 1- to 6-celled; style cylindric, stigma peltate; ovules very many on axial or parietal placentas. *Fruit* capsular, loculicidally 4- to 6-valved, or indehiscent and baccate. *Seeds* very many, minute; testa often loosely saccate; embryo very minute, solid.—DISTRIB. Genera 9, in dense woods, mostly in temperate regions, all in the northern hemisphere.

## 1. CHEILOTHECA, Hook. fil.

Small herbs, with erect, simple or forked, white or coloured stems; branches 1-flowered. *Sepals* 3 to 5, narrowly oblong like the uppermost stem-scales. *Petals* 3, erect, obtuse. *Stamens* 6; anthers linear, cells 2, confluent at the apex, dehiscing by marginal slits or pores. *Ovary* fusiform, 1-celled, narrowed into the cylindric style; stigma globose-conic, usually slightly lobed; placentas 6, parietal, 2-fid, the segments covered throughout by numerous ovules. *Fruit* fleshy, indehiscent, baccate.—DISTRIB. Species 2, Indo-Chinese and Malayan.

1. CHEILOTHECA MALAYANA, Scott. in Hook. fil. Icon. Plant., XVI. t. 1564. A root-parasite in dense forest; stem herbaceous, erect, simple or 2- to 3-forked, 6 to 9 in. high, stoutish. *Scales* ovate-oblong, obtuse, imbricated, gradually increasing upwards, lurid purple (*Scortechini*) or waxy white (*Kunstler*). *Flowers* terminal on stem and branches, 1 in. long, hidden inside the uppermost scales, and bright yellow (*Kunstler*), or with the tips of the petals exerted and white (*Scortechini*). *Sepals* 5, resembling the uppermost scales, imbricate, linear-oblong, obtuse or sub-acute, glabrous. *Petals* 3, rather larger than the sepals, rounded-cucullate at the apex, externally glabrous, internally more or less pilose. *Stamens* 6, filaments puberulous or pilose, alternately somewhat shorter and longer; anthers short, innate, hippocrepiform, cells confluent at apex, dehiscing by marginal pores. *Ovary* narrowly fusiform; stigma obscurely 4-lobed; placentas 6, parietal. *Fruit* white, fleshy, baccate, .75 in. across, tipped by the persistent remains of the stout style. Prain in Journ. As. Soc. Beng. LXXIII. 2, 205.

PERAK, in heavy jungle at about 3,500 feet elevation : *Scortechini* ; Kunstler 2715.

According to the field notes recorded by these two careful collectors the specimens gathered by Kunstler differ from those obtained by Scortechini ; in the latter the scales were lurid purple and the flowers were white, in the former the scales were waxy white and the flowers bright yellow. The petals in Kunstler's plant are sparingly hirsute within and the anthers are nearly twice as long. In other respects, however, the two plants are identical, and the doubt that one feels in connection with the two is not so much as to whether they are conspecific, as it is as to whether this Malayan *Cheilothea* be really specifically separable from the species from the Khasia Hills upon which Hooker originally based the very distinct genus *Cheilothea*. The only very tangible differences are that in the Khasia plant only 3 to 4 scales can be with propriety considered sepals, whereas in the Malayan one the number of sepals, as apart from the upper scales or bracts, is 5 ; and that in the Khasia plant the anthers are long, like linear lips on each side of the connective, whereas in the Malayan plant the anthers are much shorter and distinctly hippocrepiform. The fruit appears to be quite indehiscent, and thus deviates from the fruit in other genera of *Monotropeae*, which, so far as is known, is always loculicidally dehiscent.

#### Order LXVIII. EPACRIDEÆ.

Shrubs or small trees. *Leaves* alternate, rarely sub-opposite or pseudo-verticillate, articulated with the branches, sometimes fascicled or imbricate, coriaceous or rigid, persistent, entire, with parallel longitudinal nerves ; ex-stipulate. *Flowers* hermaphrodite, solitary and axillary or terminal, spicate or racemose, generally white or red ; usually bracteate and usually 2-bracteolate, the bracteoles similar to the sepals. *Calyx* 4- to 5-partite, the segments coriaceous, striate, imbricate, persistent. *Corolla* 4- to 5-fid, monopetalous, deciduous or sometimes marcescent ; the tube short or long, often cylindric or funnel-shaped ; the lobes short or long, erect, patent or recurved, imbricate or valvate, persistent. *Stamens* 5, rarely 4, hypogynous or epipetalous, the filaments short or long, filiform or flattened, free ; the anthers dorsifixed, oblong, dehiscing along their whole length by a single slit, 1-celled or spuriously 2-celled. *Disk* cupular, annular or of simple or bifid scales equal in number to the carpels. *Ovary* globose or ovoid, 1- to 10-celled ; style terminal, short or long, filiform ; stigmas punctiform, discoid or lobulate, sometimes annular or indusiate ; ovules in each cell solitary, pendulous, rarely erect ; or many on a central placenta. *Fruit* drupaceous, with 2 to 5 1-seeded pyrenes ; or a many-seeded capsule. *Seeds* small, with fleshy albumen, testa membranaceous ; embryo axile, orthotropous, smooth ; cotyledons short ; radicle elongate, near the hilum.—DISTRIB. About 320 species, nearly all Australian, a few in

New Caledonia and New Zealand, the Pacific Islands, or the Malay Archipelago.

#### LEUCOPOGON, Br.

Shrubs, erect or prostrate, branching, rarely trees. *Leaves* various, sessile or petiolate, striate-nerved. *Flowers* small, white, in axillary or terminal spikes or racemes, the rachis ending in an imperfect flower; bract 1, bracteoles 2 to 3 under the calyx. *Calyx* 5-partite. *Corolla*-tube funnel-shaped or campanulate; lobes 5, valvate in bud, patent or upper part recurved, hairy within. *Stamens* fixed to the top of the corolla-tube, filaments short, filiform; anthers dorsifixed, included or semi-exsert, linear or oblong. *Ovary* 2- to 5-celled; style short or elongated, terminal; stigma sub-capitate; ovules solitary in each cell, pendulous. *Fruit* drupaceous, with a crustaceous or bony endocarp, 1- to 5-celled, cells 1-seeded. *Seeds* small.—DISTRIB. About 130 species, all but about 20 Australian, the rest in New Zealand, the Pacific Islands, and the Malay Archipelago.

LEUCOPOGON MALAYANUS, Jack in Mal. Misc. I. v. 20, and Hook. Bot. Misc. II. 71. A small branching shrub, reaching 3 to 6 feet in height; branches grey, marked by the scars of fallen leaves, branchlets very leafy; branch-buds elongate, supported by imbricate parallel-veined ciliate deciduous scales. *Leaves* alternate, sessile, stiff, entire, narrowly lanceolate, acute and mucronate at apex, 1.5 to 2.5 in. long, .3 to .5 in. broad, shining and convex above, dull or glaucous beneath, ciliate when young; midrib none, nerves very close, slender, longitudinally parallel, in old leaves scarcely visible. *Flowers* in short axillary 3- to 7-flowered spikes, .5 in. long, the last flower imperfect; rachis villous, sometimes flexuose; bracts ovate, recurved, bracteoles 2, ovate, acute, ciliate, closely embracing the calyx. *Calyx*-lobes 5, crustaceous, elliptic-oblong, .125 in. long, ciliate. *Corolla* campanulate, .1 to .2 in. long; lobes 5, .1 to .15 in. long, spreading, villous within. *Hypogynous scales* 5, minute, free, obtuse. *Stamens* 5, short, alternate with the corolla-lobes; filaments inserted near the top of the anthers; anthers curved, pendent, opening longitudinally; pollen globose. *Ovary* 5-celled; ovule 1 in each cell, oblong; style erect, .05 in. long, villous; stigma sub-globose. *Fruit* a 5-celled baccate drupe, .1 to .2 in. in diam., each cell 1-seeded. *Seeds* not seen. Wall. Cat. 3720; Wall. in Roxb. Fl. Ind., ed. Carey and Wall. II. 301; G. Don Gen. Syst. III. 777; DC. Prod. VII. 744; Miq. Fl. Ind. Bat. II. 1052; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217, and For. Fl. II. 95; Clarke in Hook. f. Fl. Br. Ind. III. 477. *Styphelia malayica*, Spreng. Syst. IV. Cur. post, 67.

PERAK: Scortechini 760; Cantley 46; King's Collector 7428, 8056.



MALACCA: *Jack*; *Griffith* (K.D.) 3453/1; *Maingay* (K.D.) 704; *Lobb*; on Mount Ophir, *Moxon*; *Ridley*. SINGAPORE: *Jack*; *Sir R. Schomburgk* 50; *Wallich* 3720; *Ridley* 1832.—DISTRIB. *Bangka*, *Teysmann*; *Borneo*, *Ridley*.

VAR. *moluccana*, *Kurz* in Journ. As. Soc. Beng. XLVI. ii. 217, and For. Fl. II. 96. *Leaves* 5 to 1 in. long, subulate-pointed, venation more prominent, branchlets more slender. *L. moluccanum*, *Scheff.* Obs. Phyt. III. 97.

KEDAH peak: *Low*.—DISTRIB. *Tenasserim*, *Helfer* (K.D.) 3453.

### Order LXIX. PLUMBAGINÆ.

Herbs or undershrubs. *Leaves* various, alternate or fascicled. *Flowers* in terminal scapes or branches, capitate, spicate, racemed or paniced; bracts scarious or leafy, often sheathing the flower, bracteoles 2. *Calyx* inferior, gamosepalous, tubular or funnel-shaped, 5- to 10-ribbed, often hyaline between the ribs; lobes 5, usually scarious. *Corolla* hypogynous; petals 5, free or connate at the base or united in a linear tube; lobes spreading. *Stamens* 5, opposite the petals; filaments free or adnate in a tube with the corolla; anthers ovate or oblong, dorsifixed, cells parallel, dehiscing longitudinally. *Ovary* superior, sessile or very shortly stalked, 1-celled, 5-angular above; styles 5, distinct from the base or connate below; stigmas sub-capitate; ovule 1, pendulous from a basal ascending funicle, anatropous. *Fruit* included in the calyx or elongate or exsert, dry or indehiscent, membranous or hardened at the apex, circumsciss or breaking near the thin base, the apex often 5-valved. *Seeds* cylindric or elongate, pendulous, albumen copious or little or 0, radicle superior; embryo straight, cotyledons linear or oblong.—DISTRIB. Species about 200, mostly of sea-coasts or desert places throughout the world.

Large shrubs with broad-petioled leaves; styles 5, distinct; stamens united in a tube with the corolla . . . . . 1. *ÆGIALITIS*.  
Perennial herbs with auriculate leaves; style 1, filiform, with 5 stigmatic branches; stamens free . . . . . 2. *PLUMBAGO*.

#### 1. *ÆGIALITIS*, R. Br.

Simple-stemmed, soft-wooded shrubs. *Leaves* orbicular, alternate, coriaceous, glabrous, entire, smooth, gland-dotted, reticulately-veined, with long, thick, winged, amplexicaul petioles. *Flowers* in axillary or terminal panicles of racemes; bract 1, sheathing, coriaceous, obtuse; enclosing the 2 bracteoles. *Calyx* tubular, folded; lobes 5, short, induplicate-valvate. *Corolla* usually shorter than calyx, lobes 5,



slightly cohering at base. *Stamens* adhering to the base of the petals. *Ovary* 1-celled; styles free, stigmas capitate. *Fruit* a capsule, linear, long-exserted from the calyx, pentagonal, 1-seeded.—*DISTRIB.* Species 2, one Indian the other Australian.

*ÆGIALITIS* *ROTUNDIFOLIA*, Roxb. Fl. Ind. II. 111. A simple-stemmed, soft-wooded shrub, 3 to 8 feet high; stem about 3 in. in diam., conical in shape. *Leaves* alternate, orbicular, very slightly acute at apex, rounded or slightly cordate at base, diam. 2 to 3 in., entire, glabrous, coriaceous, minutely glandular-dotted, shining above, dull beneath; midrib thick and prominent, veins at an angle of 60 degrees with the midrib, closely reticulate; petiole very stout, 2 to 3 in. long, prominently winged, the wings sheathing, amplexicaul, leaving annular scars when they fall. *Inflorescence* of axillary or terminal paniced racemes; flowers pale yellow, nearly sessile, enclosed in sheathing bracts; bract 1, .3 to .4 in. long, concave, obtuse, enclosing the two similar but smaller bracteoles. *Calyx* cylindric, furrowed, .2 to .3 in. long; teeth 5, short. *Corolla* slightly longer than calyx; lobes 5, narrow. *Stamens* inserted on the base of the corolla; filaments shorter than corolla-tube; anthers linear-oblong. *Ovary* 1-celled, styles free, stigma capitate, ovule 1 pendulous. Wall. Cat. 7240; Griff. Notul. IV. 207; Clarke in Hook. f. Fl. Br. Ind. III. 479; Prain Beng. Plants I. 638. *Æ. annulata* var. *rotundifolia*, DC. Prod. XII. 621. *Æ. annulata*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 217; For. Fl. II. 96 (not of R. Br.). *Ægianilites rotundifolia*, Presl. Bot. Bemerk. 103.

*MALACCA*: Griffith (K.D.) 4156.—*DISTRIB.* Coasts of Bengal and Burma and the Andaman Islands, in mangrove swamps.

## 2. PLUMBAGO, Linn.

Perennial herbs or undershrubs, rarely annual, branches usually straggling or sub-scandent. *Leaves*, if present, alternate, entire, the petioles usually amplexicaul, auriculate at base. *Flowers* in terminal spikes or spicate racemes, forming sometimes a leafy terminal panicle; bract 1, bracteoles 2, usually small. *Calyx* tubular, glandular, 5-fid, the teeth erect. *Corolla* funnel-shaped; tube slender, lobes spreading. *Stamens* free; filaments filiform, inserted on hypogynous glands; anthers oblong, dorsifixed, usually exsert. *Ovary* attenuate at apex; style slender, divided into stigmatose branches; ovule 1, pendulous from a basal ascending funicle. *Fruit* a capsule, included in the persistent calyx and corolla, circumsciss near the base, hardened above; seed solitary, albumen very small, embryo slender, radicle superior, cotyledons oblong.—*DISTRIB.* About 10 species, found in the warm regions of both hemispheres.

*PLUMBAGO ZEYLANICA*, Linn. Sp. Pl. (1753) 151. A straggling perennial herb; branches rounded, striate, glabrous. *Leaves* alternate, ovate, shortly acute at apex, rounded at base and suddenly narrowed and decurrent, 2 to 5 in. long, 1 to 2.5 in. broad, entire, thin, glabrous above, somewhat scurfy beneath and often glaucous; midrib slender, prominent beneath, main-nerves 6 to 7 pairs, also prominent, curving upwards, secondary nerves and reticulations obscure; petiole .5 to 1 in. long, winged by the gradually narrowing decurrent base of the blade, auricled and amplexicaul at base. *Inflorescence* a terminal leafy panicle of spicate racemes, the rachis densely glandular; bract ovate, acuminate, bracteoles 2, linear-subulate; pedicels very short or none, bracts and pedicels glandular. *Calyx* narrowly tubular, about .5 in. long, more or less deeply 5-fid; lobes slender, hyaline on the margins, covered thickly on the back with prominent stalked red glands. *Corolla*-tube white, slender, funnel-shaped, membranous, about 1 in. long; lobes 5, nearly .5 in. long, ovate, acute, patent. *Stamens* 5, free; filaments very slender; anthers oblong, dorsifixed, exsert. *Ovary* ovoid; style filiform, dividing into 5 stigmatose branches. *Capsule* membranous below, thick above, 5-furrowed, sharply pointed; seed pendulous, oblong; cotyledons obtuse. DC. Prod. XII. 692; Roxb. Hort. Beng. 13, Fl. Ind. I. 462; Wall. Cat. 7241g; Wight III. t. 179; Miq. Fl. Ind. Bat. II. 994; Dalz. and Gibs. Bomb. Fl. 220; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217; Clarke in Hook. f. Fl. Br. Ind. III. 480; Trimen Fl. Ceyl. III. 65; Prain Beng. Plants I. 639. *P. auriculata*, Bl. Bijdr. 736. *P. viscosa*, Blanco Fl. Filip. ed. I. 78. 'Tumbacodivéli,' Rheede Hort. Mal. X. t. 8.

PENANG: *Curtis* 93; *Deschamps*. NEGRI SEMBILAN: *Ridley* 10095. SINGAPORE: *Deschamps*; *King's Collector* 284.—DISTRIB. Tropical regions of the Old World, doubtfully indigenous in the Malay Peninsula or elsewhere.

#### Order LXXVIII. GENTIANACEÆ.

[By C. B. CLARKE.]

Herbs, erect, twining, or floating; glabrous except *Microrophium*. *Leaves* entire; those of the lower main stem opposite except in the floating plants. *Inflorescence* in 2- to 3-divided cymes, or peduncles 1-flowered. *Flowers* symmetric in calyx, corolla, stamens (except in *Canscora*). *Calyx* tubular or campanulate; lobes 4 to 5 (or by accident (?) 6), oblong or linear. *Corolla* gamopetalous, tube long or short; lobes as many as calyx-segments, usually dextrorsely contorted in the bud. *Stamens* as many as the corolla-segments, all perfect (except in

*Canscora*); filaments on the corolla-tube; anthers of 2 parallel cells. Ovary 1- (or imperfectly 2-) celled; of 2 carpels, superior or stalked or slightly inferior; style linear or oblong; stigma capitate or shortly 2-lobed; placentas parietal, sometimes much intruded, partly coalescing in the axis; ovules very many. Capsule dehiscent or indehiscent, not rarely becoming more or less succulent; seeds many, albuminous.—DISTRIB. Species 700; found in all countries.

Erect herbs; lower stem leaves (often all the leaves) opposite:—

Glabrous; corolla blue	..	..	..	1. EXACUM.
Pubescent all over	..	..	..	2. MICRORPHITUM.
Glabrous; corolla rose-coloured or white	..	..	..	3. CANSORA.
Twining; corolla narrow, more than 1 in. long	..	..	..	4. CRAWFURDIA.
Floating (or creeping on mud); leaves round-ovate:—				
Peduncles solitary, from the axil of a long-petioled leaf	..	..	..	5. VILLARSIA.
Peduncles clustered, from the axil of a sessile leaf..	..	..	..	6. LIMNANTHEMUM.

### 1. EXACUM, Linn.

Glabrous erect herbs. Leaves opposite, usually 3- to 5-nerved. Flowers paniced, 4- to 5-merous. Calyx deeply lobed. Corolla rotate; tube globose; lobes ovate or oblong, blue or white. Stamens attached in the corolla throat; anthers large, of two oblong cells, which open first by terminal pores or short slits. Ovary more or less completely 2-celled; style linear; stigma sub-capitate. Capsule globose, septically 2-valved; seeds numerous, minute, cuboid.—DISTRIB. Species 30, whereof 20 Indian, the others in China, Malaya, Africa.

Stem 1 to 4 feet; corolla-lobes $\frac{1}{2}$ in. long, azure blue	..	1. <i>E. tetragonum</i> .
Stem 4 to 12 in.; corolla-lobes $\frac{1}{4}$ to $\frac{1}{2}$ in. long, pale blue	..	2. <i>E. pedunculatum</i> .

1. EXACUM TETRAGONUM, var.  $\beta$  *stylosa*, C. B. Clarke in Hook. fil. Fl. Br. Ind. IV. 95. Stem 1 to 4 feet, quadrangular. Leaves 5 by 1 in., sessile, lanceolate, 3- to 5-nerved. Panicle many-flowered; bracts at its divisions .25 to .5 in. long, linear; flowers 4-merous, or rarely 5-merous. Calyx-lobes .25 in. long, ovate acuminate. Corolla-lobes .5 in. long, broadly elliptic acute, full azure-blue. Anthers .2 in. long, straight. Style .5 in. long. Capsule globose, .25 in. in diam. *E. stylosum* (sp.), Griseb. in DC. Prod. IX. 46. *E. chironioides*, Griseb. Gent. 109, in DC. Prod. IX. 45. *E. Horsfieldianum*, Miq. Fl. Ind. Bat. II. 556. *E. sulcatum*, C. B. Clarke in Journ. Linn. Soc. XIV. 425 (not of Roxb.). *E. tetragonum*, Vidal Fl. Filip. 191.

SINGAPORE: Lobb 473.—DISTRIB. From Burma to Borneo and the Philippines.

2. EXACUM PEDUNCULATUM, Linn. Sp. Pl. ed. I. 112; ed. II. 163.

*Stem* 4 to 12 in., quadrangular, often much-branched. *Leaves* 1·5 by ·5 in., sub-sessile, elliptic or lanceolate, 3-nerved. *Panicle* usually compound, many-flowered; lower bracts similar to the leaves, by degrees smaller, to the upper less than ·25 in. long; flowers 4-merous. *Calyx-lobes* ·17 to ·2 in. long, ovate, acute, winged. *Corolla-lobes* ·25 to ·35 in. long, pale blue. *Anthers* ·12 in. long, dehiscing finally half-way down. *Capsule* globose, ·17 in. in diam. DC. Prod. IX. 46; Hook. fil. Fl. Br. Ind. IV. 97; Trimen, Fl. Ceyl. III. 182. *E. pedunculare*, Arn. in Ann. Sc. Nat. ser. 2, XI. 176; Wight Ic. t. 336. *E. sulcatum*, Roxb. Fl. Ind. ed. Carey & Wall. I. 415; DC. Prod. IX. 46 (*syn. excl.*).

SINGAPORE: Lobb 358.—DISTRIB. From Oudh and Bengal to Ceylon and Pegu.

## 2. MICRORPHIUM, C. B. Clarke, gen. nov.

A pubescent erect herb, repeatedly branched. *Leaves* alternate except a few distant opposite pairs on the main stem. *Flowers* numerous, solitary, pedicelled, in unilateral repeatedly branched cymes. *Calyx* short-cylindric, terete, sub-2-lipped, almost leathery; lobes 5, short. *Corolla* small; tube campanulate, lobes 5, equal, dextrorsely contorted in the bud. *Stamens* 5, equal, perfect; anthers exsert, cells oblong, parallel, dehiscing by a slit their whole length. *Ovary* 1-celled; placentas intruded; style linear, stigma sub-capitate. *Seeds* very small, ovoid, not angular.—DISTRIB. Species 1, Malayan.

1. MICRORPHIUM PUBESCENS, C. B. Clarke, sp. nov. *Stem*, leaves, inflorescence, calyx covered with a short thick grey pubescence. *Stem* (upper part seen) 14 in. long; the lower part with opposite pairs of leaves (and branches) 2·5 in. apart; all the other numerous stem-divisions and leaves alternate. *Leaves* of the main stem ·75 by ·35 in., elliptic, entire, obtuse, narrowed at base; petiole 0 to ·1 in. long; the other leaves similar but smaller. *Pedicels* ·25 in. long. *Calyx* ·2 in. long; opening at first in two lips, one emarginate 2-nerved, the other ovate 3-nerved. *Corolla-tube* broad, lobes short, round, soon reflexed over the calyx-margin. *Capsule* ovoid, ·2 in. long, dry; seeds 200  $\mu$  in diam. *Pollen* globose; 25  $\mu$  in diam.

KEDAH: Curtis 2528. "Height 1 to 2 feet; petals white; anthers yellow" (Curtis).

## 3. CANSCORA, Lam.

Herbs, dichotomously branched, glabrous or very nearly so. *Leaves* opposite. *Flowers* mostly cymose. *Calyx* large, membranous, tubular, often winged; teeth much shorter than the tube. *Corolla-tube* cylindric; lobes 4, unequal (except in *C. pentanthera*). *Ovary* 1-celled;



placentas intruded; style linear, lobes 2, hemispheric. *Capsule* 2-valved or breaking up irregularly. *Seeds* very small, polyhedral.—DISTRIB. Species about 25, extending from Africa through South-east Asia to Australia.

One stamen only perfect; corolla irregular	..	..	1. <i>C. diffusa</i> .
All stamens perfect; corolla regular	..	..	2. <i>C. pentanthera</i> .

Sub-genus 1. EU-CANSORA. Calyx 4-toothed. Corolla sub-bilabiate. Stamens 4; 1 larger perfect, 3 shorter smaller or obsolete.

1. CANSORA DIFFUSA, R. Brown, Prodr. (1810) 451 in Obs. Erect annual, 4 to 20 in., much branched upwards. *Leaves* 1·5 by ·5 in., lanceolate or elliptic, 3-nerved, often petioled, upper smaller. *Cyme* diffuse; lower bracts at its divisions ·5 in. long, ovate, upper much smaller. *Calyx*  $\frac{1}{2}$  in. long; teeth lanceolate-linear. *Corolla* rose-coloured; tube  $\frac{1}{2}$  in., lobes  $\frac{1}{6}$  in. *Capsule* oblong, as long as the calyx. DC. Prodr. IX. 64; Benth. Fl. Austral. IV. 372; Hook. fil. Fl. Br. Ind. IV. 103; Trimen Fl. Ceyl., III. 184. *Exacum diffusum*, Willd. Sp. Pl. I. 637. *Orthostemon erectum*, R. Br. Prodr. 451; DC. l.c. 63. *O. Hugelii*, DC. l.c. 63. *Pladera virgata*, Roxb. Fl. Ind. ed. Carey & Wall. I. 417; Hook. Bot. Misc. III. 88 t. 25.

SINGAPORE: Lobb 345. A common species, extending from East Tropical Africa throughout India to Australia and the Philippines.

Sub-genus 2. PENTANTHERA. Stamens 5 (or 6), equal, anthers all similar, perfect. Corolla-lobes 5 (or sometimes 6), equal, dextrorsely contorted in the bud.

2. CANSORA PENTANTHERA, C. B. Clarke, sp. nov. A slender under-shrub, 18 in. high, glabrous except the minutely gland-puberulous (young) petioles; stem terete with many opposite branches. *Leaves* opposite, 3 by 1 in., ovate-lanceolate, acuminate, attenuate at the base; petiole 0 to ·2 in. *Cymes* loosely, repeatedly dichotomous, often carrying 10 flowers; bracts at the divisions similar to the leaves, but gradually smaller, becoming sessile, a few pairs connate into perfoliate bracts. *Flowers* solitary, ·5 in. long, on pedicels ·12 to ·5 in. long. *Calyx* ·35 in. long, membranous; tube triquetrous, narrowly 3-winged, ovoid-cylindric; lobes less than one-third the length of the tube, ovate, imbricate, apiculate. *Corolla* white (Ridley); tube as long as the calyx, lobes 5 (or not rarely 6), oblong-elliptic, equal, sub-erect, contorted dextrorsely (*sensu Linneano*) in the bud. *Stamens* 5 (or 6 in the 6-lobed corolla), equal, perfect; filaments inserted in the upper part of the corolla-tube from which the erect anthers are half-exsert; anther-cells 2, oblong or linear-oblong, opening by longitudinal slits; pollen 25 by 20  $\mu$ , ellipsoid, irregularly longitudinally striate. *Ovary* oblong, when young thin,

almost succulent; placentas much intruded; style linear, with 2 round stigmatic lobes. *Capsule* broad-ellipsoid, crustaceous, almost succulent (dehiscence not clear); style persistent; seeds  $300\ \mu$  in diam., ovoid, somewhat angular, brown.

PERAK, Waterloo: *Robertson* 9088. SELANGOR: Sua Batu, *Ridley*; Gua Batu, *Ridley* 8218. KEDAH: Langkau, *Curtis* 2516.

This species, the only one in the sub-genus, differs in the aestivation of the corolla, the number of the stamens, the anthers all equal, the persistent style, from the characters assigned to *Canscora*.

#### 4. CRAWFURDIA, Wall.

Glabrous twiners. *Leaves* opposite, petioled, 3-nerved. *Flowers* showy, axillary. *Calyx* tubular; teeth 5 (or 4), long, often very long. *Corolla* long, tubular-funnel-shaped; lobes 5, short. *Stamens* 5 on the corolla-tube; anthers oblong. *Ovary* stalked, 1-celled, placentas parietal; style linear, stigmas 2, short-oblong. *Fruit* globose or ellipsoid, berried or capsular; seeds many, 2- (or imperfectly 3-) angled.—DISTRIB. Species 10–12, extending from India to Manchuria.

1. CRAWFURDIA BLUMII, G. Don Syst. IV. 200. *Stem* often 3 to 4 feet long. *Leaves* (blade) 1.5 by .75 in., ovate-lanceolate, acute, entire; base rounded or narrowed; petiole .35 in. *Flowers* axillary, solitary, sub-sessile, or the pedicel .25 to 1.5 in. long. *Calyx* narrow, angular; tube .2 in. long, teeth .25 in. long, linear. *Corolla* 1.25 to 1.5 in. long, light purple. *Fruit* .6 in. long, ellipsoid, purple, succulent. *Seeds* imperfectly 3-angular, angles (or 2 of them) often narrowly winged. Miq. Fl. Ind. Bat. v. II. 561 (*Blumei*). *C. trinervis*, Hassk. Cat. Hort. Bogor. 128, in Tidjsh. Nat. Gesch. X. 126. *Tripterospermum trinerve*, Blume Bijdr. 849; Griseb. in DC. Prod. IX. p. 121. [Cf. C. B. Clarke in Fl. Br. Ind. IX. p. 107, sub *Crawfurdia affini*, Wallich.]

PAHANG, 7,000 feet alt.: *Wray* 1570.—DISTRIB. Sumatra, Java.

#### 5. VILLARSIA, Vent.

Floating, glabrous herbs. *Leaves* long-petioled, ovate, entire or sinuate. *Peduncles* solitary, 1- (or many-) flowered. *Calyx* deeply 5-lobed. *Corolla* broadly campanulate; tube short, lobes sub-rotate. *Stamens* 5; filaments filiform, on the corolla-tube; anthers sagittate. *Ovary* 1-celled; style short; stigma of 2 small lobes; placentas parietal. *Capsule* globose, 1-celled, 4-valved at the apex; seeds several (or numerous).—DISTRIB. Species 12, in Africa or in Australia, except the following Malay species.

1. VILLARSIA AURANTIACA, *Ridley* MS. A small herb; stems 2 in.

long, with leaves and peduncles at the nodes. *Leaves* all long-petioled, .35 in. in diam., widely excavated at the base, ovate, margin sinuate; petiole .5 to 2 in. long. *Peduncles* solitary, 1 to 2 in. long, ebracteate, 1-flowered. *Calyx* .17 in. long, lobes oblong. *Corolla* .35 in. in diam.

PAHANG: Kwala Pahar, Ridley.

This example shows no fruit, and the flowers are not in a state for dissection. This collection has been supposed to be near *Limnanthemum parvifolium*, Griseb., which has smaller flowers, with the peduncles (several) clustered in the axil of a sessile leaf. This plant of Ridley appears to come near the Swan River *Villarsia violifolia*, F. Muell.

# 6. LIMNANTHEMUM, S. P. Gmel.

*Peduncles* several in the axil of a nearly sessile leaf. *Capsule* thin, breaking up irregularly, otherwise as *Villarsia*.—DISTRIB. Species 20, dispersed throughout the Tropical and Temperate Zones.

1. LIMNANTHEMUM PARVIFOLIUM, Griseb. in DC. Prod. IX. 141. *Stem* 3 to 8 in. long, slender, with distant nodes. *Leaf* .75 in., round, ovate, excavated at base, gland-dotted on the under surface; petiole scarcely .08 in. *Pedicels* clustered, 0 to .25 in. long. *Calyx-lobes* .08 in. long, lanceolate, acute. *Corolla-lobes* .17 in. long, white, fimbriate. *Capsule* .17 in. long, ellipsoid, sessile, about 10-seeded; seeds smooth but with capitate papillæ sparsely irregularly scattered. Hook. fil. Fl. Brit. Ind. IV. 132; Trimen, Fl. Ceyl. III. 189.

SINGAPORE: *Cuming* 2280 (in Mus. Brit.).—DISTRIB. Malabar, Ceylon; Chittagong to Tavoy.

LONDON

PRINTED BY WEST, NEWMAN AND CO.

HATTON GARDEN



# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV., PART II.—Extra Number, 1905.

---

*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., F.L.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, Esq., C.I.E., M.A., F.R.S., F.L.S., late of the Indian Forest Department.

### No. 17.

This contribution embraces the Natural Orders *Myrsinaceæ*, *Sapotaceæ*, *Ebenaceæ*, *Styraceæ*, *Oleaceæ*, which are given under the joint names of the authors, the actual descriptions having been prepared by Sir George King for the *Ebenaceæ* and by Mr. J. S. Gamble for the rest.

The 5 Natural Orders comprise 24 genera and 221 species. There are no new genera, but the number of new species reaches 103.

### Order LXX. MYRSINACEÆ.

Trees, shrubs (erect or climbing), or undershrubs, generally evergreen. *Leaves* usually alternate, sometimes opposite, entire dentate or crenate, often dotted with pellucid round or linear resinous glands. *Stipules* none. *Flowers* regular, usually small, white or reddish; hermaphrodite or occasionally polygamo-dicæous; generally in panicles, racemes or umbels. *Calyx* inferior (in *Mæsa* adnate to the ovary), 4-6-lobed, the lobes valvate or imbricate, sometimes enlarged in fruit, persistent, often marked with glandular dots or lines. *Corolla* 4-5-lobed; the tube usually very short, sometimes wanting; lobes twisted to the left in the bud, usually overlapping to the right, rarely

valvate, often gland-dotted or -striate. *Stamens* opposite to the corolla-lobes and equal to them in number, free or adnate to the lobes or in an inner ring, generally erect; filaments long or short; anthers opening by slits, usually introrsely, sometimes septate as in *Ægiceras* and *Ardisia littoralis*, sometimes with terminal openings as well, free or adherent by their edges; the connective often thickened and produced, sometimes glandular; staminodes sometimes present, though not in Malay species. *Ovary* globose, ovoid or oblong, free (in *Mæsa* adherent to the calyx-tube), 1-celled, narrowed into or surmounted by the style; style filiform or columnar, stigma usually simple; ovules few or many, inserted on or immersed in a free usually globose central placenta. *Fruit* usually small, globose (in *Ægiceras* linear, curved, acuminate); epicarp fleshy, mesocarp crustaceous, endocarp membranous, separable; usually one- rarely several-seeded (as in *Mæsa*), indehiscent. *Seeds* usually globose, hollowed at the base: in *Mæsa* many and angled; albumen pitted or ruminate; embryo transverse, cylindric; radicle usually elongate.—**DISTRIB.** Tropical or sub-tropical regions of both hemispheres, chiefly in Asia and South America; genera 32, species upwards of 900 (according to Mez Monog. *Myrsineæ*).

Calyx-tube adnate to the ovary; fruit many-seeded (Tribe I. **MÆSÆ**):—

Trees or shrubs; calyx 2-bracteolate; flowers in simple or compound racemes .. .. . 1. **MÆSA**.

Calyx-tube free from the ovary; fruit one-seeded (Tribe II. **EUMYRSINÆ**):—

Fruit round; anther-cells usually opening by slits, rarely septate:—

Corolla-lobes imbricate in bud:—

Flowers in axillary or lateral fascicles; trees or shrubs .. 2. **MYRSINE**.

Flowers in racemes or panicles; climbing plants, rarely shrubs .. .. . 3. **EMBELIA**.

Corolla-lobes valvate in bud; flowers in paniculate spike-like racemes; small shrubs with parallel-veined leaves .. 4. **LABISIA**.

Corolla-lobes contorted in bud:—

Anthers sagittate, rarely septate; corolla-lobes overlapping to the right .. .. . 5. **ARDISIA**.

Anthers sagittate-lanceolate, the connective produced in a membranous wing; corolla-lobes overlapping to the left .. 6. **ANTISTROPHE**.

Fruit elongate, cylindric, long-pointed; anthers markedly septate 7. **ÆGICERAS**.

#### 1. **MÆSA**, Forsk.

Trees or shrubs, erect or straggling. *Leaves* entire, dentate or serrate, usually pellucid-punctate, sometimes with resinous lines. *Flowers* hermaphrodite or unisexual, in terminal or axillary racemes, the pedicels bracteate. *Calyx* bibracteolate, 4-5-lobed; lobes persistent,

imbricate; the tube adnate to the ovary, sometimes with resinous lines. *Corolla* shortly campanulate, 4-5-lobed; the lobes usually as long as the tube or rather shorter, rounded with inflexed tips, sometimes resinous-lineate. *Stamens* 4 or 5, inserted on the corolla-tube; filaments short; anthers introrse, oblong-cordate. *Ovary* adnate to the calyx-tube; style short; stigma small, entire or shortly 3-5-lobed; ovules numerous, placenta globose. *Fruit* small, dry or fleshy, ovoid or subterbinate, crowned with the persistent style, many-seeded. *Seeds* numerous, angular, immersed in hollows of the placenta, and arranged around it with hexagonal surfaces, embryo small, oblique or transverse, cotyledons narrowly ovate.—**DISTRIB.** Species over 100 (according to Mez), chiefly in the tropical regions of the Old World, a few in Australia and the Pacific Islands; all the Malayan species belonging to sub-genus *Eumæsa*, Mez.

Leaves entire :—

- |  |                            |
|--|----------------------------|
| Flowers in large terminal leafy panicles; branches of the inflorescence pubescent .. .. .                    | 1. <i>M. macrothyrsa</i> . |
| Flowers in large axillary or pseudo-terminal panicles of racemes; branches of inflorescence glabrous .. .. . | 2. <i>M. ramentacea</i> .  |

Leaves faintly lobed :—

- |   |                               |
|---|-------------------------------|
| Leaves very slightly dentate, almost coriaceous, under 3·5 in. long, midrib and main-nerves very prominent; inflorescence as long as or only a little shorter than leaves .. .. . | 3. <i>M. impressinervis</i> . |
| Leaves membranous, over 4 in. long :—   |                               |

- |   |                        |
|---|------------------------|
| Leaves pale when dry, under 3 in. broad, distantly dentate, inflorescence longer than the petiole .. .. . | 4. <i>M. striata</i> . |
|---|------------------------|

- |  |                           |
|--|---------------------------|
| Leaves dull green when dry, over 4 in. broad, inflorescence scarcely longer than the petiole .. .. . | 5. <i>M. pahangiana</i> . |
|--|---------------------------|

- |                                    |                       |
|------------------------------------|-----------------------|
| Leaves prominently dentate .. .. . | 6. <i>M. indica</i> . |
|------------------------------------|-----------------------|

1. *MÆSA MACROTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub reaching 30 to 50 feet in length; branches brown, somewhat angled and flexuose, striate. *Leaves* entire, chartaceous; elliptic, shortly bluntly acuminate at apex, rounded at base; smooth and dull on both surfaces; 3 to 4 in. long, 1·5 to 2 in. broad; midrib prominent, impressed above; main-nerves 5 to 7 pairs, distant, starting from the midrib at about 60° and curving upwards; secondary nerves and reticulations indistinct; petiole ·5 to ·7 in. long, channelled above by the decurrent margins of the blade. *Inflorescence* a large leafy terminal many-flowered tripinnate panicle, the branches rusty pubescent; pedicels about ·025 in. long, supported by a slightly shorter ovate-acute bract, and bearing 2 similar bracteoles below the flowers. *Calyx* superior, cupular; lobes 4, occasionally 5, rounded, denticulate, ·04 in. long, gland-dotted; tube very short. *Corolla* dull white or pink, longer than calyx; tube as long as lobes; lobes 4 or 5, rounded, often with

small lobules between, denticulate, with about 3 to 4 glandular lineoles. *Stamens* inserted near the base of the corolla-tube; anthers globose; filaments about twice as long as anthers. *Ovary* rounded, depressed, crowned with a short cylindric style and obtusely 3-4-lobed stigma. *Fruit* very small, .05 in. in diam., globose, glabrous, faintly striate, crowned about one-third of the way down with the persistent calyx-teeth. *Seeds* very minute, angled. Scheff. Myrs. 29; Mez Monog. Myrs. 49. *M. floribunda*, Scheff. Myrs. 18. *M. Korthalsiana*, Scheff. Myrs. 18 (?)

PERAK: Wray 2684; Scortechini 122, 1655; King's Collector 725, 2722, 3777, 4968, 5326.—DISTRIB. Sumatra, Korthals, Beccari 887; Borneo, de Vriese, Teysmann.

We have always found the flowers tetramerous, as described by Miquel and Scheffer. Mez describes them as either 4- or 5-merous. This is a well-marked species on account of its large terminal inflorescence, whose pubescent branches easily distinguish it from those occasional forms of *M. ramentacea* which have part of the inflorescence pseudo-terminal.

2. *MÆSA RAMENTACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 231 (1824). A large shrub or small tree, usually branched from the base and sending out many straggling or climbing branches often 30 to 40 feet long or more; branchlets smooth, somewhat striate when dry. *Leaves* entire, chartaceous; ovate-lanceolate or elliptic, acuminate at apex, rounded or cordate at base; 3 to 8 in. long, 1.5 to 4 in. broad; smooth on both surfaces and generally shining above; midrib prominent, often impressed above; main-nerves slender, distant, 5 to 10 pairs, starting at 45° with the midrib and curved upwards; secondary nerves and reticulations not apparent: petiole .3 to .5 in. long, slightly winged by the decurrent margins of the blade, which are often connivent above. *Inflorescence* axillary or sometimes pseudo-terminal, glabrous, many-flowered, consisting of more or less closely packed racemes arranged in bipinnate panicles, shorter or longer than the leaves; pedicels .1 to .15 in. long, slender, supported by a minute lanceolate bract and with 2 very minute ovate-lanceolate bracteoles below the flower; buds minute, globose, depressed at top. *Calyx* superior, cupular; tube very short, about .025 in. long; lobes 5, ovate, faintly ciliate, as long as the tube. *Corolla* .075 in. long; lobes half the length, ovate or ovate-reniform, edges undulate, with a few brown glandular lineoles. *Stamens* short, longer in ♀ flowers, inserted a little below the top of the tube; anthers rounded, filaments as long as the anthers, dorsifixed. *Ovary* in ♀ flowers adnate to the base of the calyx-tube, style short, stigma minutely 4-lobed, ovules many. *Fruit* globose, .1 to .15 in. long, crowned with the persistent teeth of the calyx; seeds minute, angled,



albuminous, embryo small, transverse. A. DC. in Trans. Linn. Soc. XVII. 133, Prod. VIII. 77; Scheff. Myrs. 15; Miq. Fl. Ind. Bat. II. 1006; Kurz in Journ. As. Soc. Beng. XLVI. ii. 220; For. Fl. II. 99; Clarke in Hook. f. Fl. Br. Ind. III. 508; Koord. & Val. Bijdr. V. 218; Mez Monog. Myrs. 27; Prain Beng. Pl. 642. *M. ovata*, A. DC. l.c. 133, t. 4, Prod. l.c. 77; Scheff. Myrs. 14. *M. lanceolata*, Don Prod. 148. *M. acuminata*, *missionis*, and *glabra*, DC. Prod. l.c. 77, 78, 82. *M. sumatrana*, Scheff. Myrs. 15. *Bæobotrys ramentacea*, Roxb. Hort. Beng. 16, Fl. Ind. I. 558; Wall. Cat. 2322. *B. ovata*, Wall. Cat. 2324. *B. glabra*, Roxb. Fl. Ind. I. 560. *B. fragrans*, Wall. Cat. 2323. *B. (?) missionis*, Wall. Cat. 6523.

KEDAH: Langkawi, Curtis 2554, 3409. PENANG: Wallich 2324; Maingay (K.D.) 1001; J. Scott; G. King; Phillips; Deschamps. PERAK: Scortechini 382A, 606B, 628; Wray 1286, 1291, 1912, 2363, 2787; King's Collector 171, 1222, 1909, 2788, 3883, 4144, 4281, 4497, 4915, 5088, 5113; Curtis. PAHANG: Ridley 2175. SELANGOR: Ridley; Goodenough 10554. NEGRI SEMBILAN: Ridley 10067. MALACCA: Griffith (K.D.) 3552; Cuming 2286; Miller 9; Hervey; Goodenough 1036, 1742; Derry 37, 1063; Ridley 10099. JOHORE: Lake & Kelsall 4035; G. King. SINGAPORE: Schomburgk 91; Lobb 324; T. Anderson 126; Ridley 2064, 2805; Goodenough 1644; Hullett 38, 56, 885, 887.—DISTRIB. Eastern Bengal and Burma, Andaman and Nicobar Islands, Sumatra, Java, Borneo.

We follow Mez in not keeping up the var. *ovata*. The large mass of material available shows clearly that in shape of leaf and in inflorescence the variation is regular, and that the form with cordate long-acuminate leaves passes gradually into that with ovate broad short-acuminate leaves, and that similarly the inflorescence changes. A monstrous form with moss-like inflorescence similar to those often seen in India on *M. Chisia* and other species, is not uncommon.

3. *MÆSA IMPRESSINERVIS*, King & Gamble, n. sp. A bush or small tree; branches half as thick as a goosequill, glabrous, pale brown, and prominently longitudinally wrinkled when dry. Leaves thinly coriaceous; elliptic, shortly acuminate at apex, cuneate at base; entire or very faintly dentate only near the apex, margins recurved when dry, reticulate and shining above, dull and paler beneath; 3 to 3.5 in. long, 1.25 to 1.75 in. broad; midrib prominent, impressed above; main-nerves 7 or 8 pairs, also prominently impressed above and prominently raised on the lower surface, arching upwards to meet near the margin; secondary nerves few, inconspicuous as are the reticulations; petiole .2 to .25 in. long, bordered by the decurrent edges of the blade, which are almost connivent above. Inflorescence an axillary raceme, simple or with one short branch near the base, 1.5 to 2.5 in. long, and so shorter

than the leaves; pedicels slender, .1 in. long, with a .06 in. long subulate bract at the base and 2 similar bracteoles beneath the flower; buds nearly globose. *Calyx* superior, .05 in. in depth, cupular, with 5 imbricate broad incurved concave glabrous lobes. *Corolla* rotate with 5 imbricate rounded broad lobes, .1 in. deep; tube rather longer than lobes. *Stamens* 5, inserted on the base of the corolla; anthers globular; filaments flattened, longer than the anthers. *Ovary* inferior, depressed, surmounted by a flattened lobed stigma, 1-celled; ovules many, cuneate, on a central basal placenta. *Fruit* unknown.

PERAK: Gunong Bubu, at 5,000 feet elevation; Wray 3850, 3886.

4. *MÆSA STRIATA*, Mez Monog. Myrs. 42 (1901). A shrub or small tree; branches smooth, reddish, with scattered lenticels. *Leaves* membranous; rather variable, elliptic or elliptic-oblong, rounded or acuminate at apex, bluntly acute and sometimes unequal at base; entire or undulate or broadly dentate, especially on the upper half, pale green when dry, glabrous except for a few occasional stiff hairs on the midrib beneath, striate with many faint very slender lineoles; 4 to 7 in. long, 2.5 to 3 in. broad; midrib angular, prominent beneath, main-nerves 7 to 8 pairs, slender; secondary nerves and reticulations faint and irregular; petiole slender, .4 to 1 in. long, channelled above. *Inflorescence* of axillary racemes, simple or joined in a sub-sessile panicle, rarely over 2 in. long; pedicels very slender, .05 to .1 in. long, with a subulate bract at base, half their length, and 2 acute bracteoles under the flower. *Calyx* superior, about .1 in. deep; lobes 5, imbricate, ovate, rounded, about 4-striate, edges hyaline; tube as long as lobes. *Corolla* as long as calyx, rotate, .1 in. in depth; lobes 5, imbricate, rounded, crenate, glabrous. *Stamens* 5, inserted near the base of the corolla; anthers ovate, slightly divaricate; filaments 2 to 3 times as long as anthers. *Ovary* inferior, depressed, rounded; style short cylindrical, stigma 4-lobed; ovules many, cuneate, on a central basal placenta. *Fruit* round, .1 to .15 in. in diam., smooth, faintly ribbed, crowned by the persistent calyx-lobes and style.

PENANG: at Paya Trobong, Curtis 2857. PERAK: King's Collector 2287.—DISTRIB. Sumatra, Forbes 1260, 1287, 1315, 1376.

5. *MÆSA PAHANGIANA*, King & Gamble, n. sp. Apparently a shrub; branches round, smooth, dark brown when dry. *Leaves* membranous; rhomboid-obovate, acuminate at the apex, rounded cuneate at base; faintly crenate especially in the upper half; glabrous on both dull surfaces; 7 to 8 in. long, 4 to 4.5 in. broad; midrib slender, prominent beneath; main-nerves distant, 8 to 9 pairs, at about half a right angle with the midrib, sometimes branched; secondary nerves few and like the reticulations indistinct; petiole slender, .8 to 1 in. long. *Inflores-*

cence a simple axillary raceme, as long as or slightly longer than the petiole; pedicels slender, about .1 in. long, supported by a minute subulate bract below and with two similar bracteoles below the flower. *Calyx* superior, cupular, with a very short tube and 5 triangular imbricate teeth .6 in. long, glabrous, hyaline at the edges and very faintly brown-glandular. *Corolla* as long as calyx; lobes 5 imbricate, glabrous, rounded, somewhat crenate, with 2 to 3 prominent brown glandular lineoles; tube half the length. *Stamens* nearly as long as corolla, inserted near its base; filaments about twice as long as the anthers; anthers emarginate, cells somewhat divaricate. *Fruit* globose with a conical tip surrounded by the remains of the corolla and the persistent calyx, and surmounted by the short persistent style, ribbed, .125 in. in diam., glabrous.

PAHANG: at Tanjong Antan, *Ridley* 2175A.

Only one specimen is unfortunately available, and that in fruit, with only remains of flowers.

6. *MÆSA INDICA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 230 (1824). A shrub reaching 4 to 6 feet in height; branchlets brown, smooth, lenticellate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate, rounded or acute at the base; repand-dentate, about 3 teeth to each main-nerve; 3 to 7 in. long, 2 to 3 in. broad; midrib very prominent, often broad; main-nerves 8 to 12 pairs, others closely reticulate; glandular striæ long, prominent; petiole .5 to 1 in. long, channelled above by the decurrent bases of the blade. *Inflorescence* of simple or compound axillary racemes, much shorter than the leaves, usually 1 to 3 in. long; pedicels slender, .05 to 1 in. long, longer in fruit; bracts subulate, in flower as long as pedicels; bracteoles 2, minute. *Calyx* superior, with 5 imbricate lobes, which are ovate, ciliate, striate, about .04 in. long, almost acute or rounded at apex. *Corolla* as long as calyx; lobes denticulate, glandular-striate; tube as long as lobes. *Stamens* inserted at base of corolla-tube; anthers ovate, cells divaricate; filaments dorsifixed, rather longer than anthers. *Ovary* rounded; style short cylindric, stigma obtuse; ovules many. *Fruit* round, smooth, striate, .15 in. long, crowned at the summit by the persistent calyx-lobes and the remains of the stigma. *Seeds* angular. A. DC. in Trans. Linn. Soc. XVII. 134, Prod. VIII. 80 (*in part*); Wall. Cat. 2318 E.; Clarke in Hook. f. Fl. Br. Ind. III. 509 (*in part*); Koord. & Val. Bijdr. V. 222; Mez Monog. Myrs. 29. *Bæobotrys indica*, Roxb. Hort. Beng. 16, Fl. Ind. I. 557.

PERAK: *Wray* 3314, 3349; *Scortechini* 16, 733; *Ridley* 3007, 9741; *King's Collector* 7712.—DISTRIB. Burma, Java.

## 2. MYRSINE, Linn.

Trees or shrubs. *Leaves* entire or serrate, often thick, usually pellucid-punctate. *Flowers* polygamous or diœcious, fascicled, axillary or on very short branches, pedicels short with many imbricate bracts. *Calyx* small, lobes 4 to 5 persistent. *Corolla* 4-5-lobed, the lobes imbricate in bud, recurved in flower. *Stamens* 4 to 5; filaments short, inserted at the base of the corolla-lobes; anthers short, ovate; staminodes none. *Ovary* free, globose or ovoid; style usually short, cylindric or angular; stigma capitate or 2-5-lobed; ovules few or many, immersed in the placenta. *Fruit* a small, dry or somewhat fleshy, berry, 1-seeded. *Seed* solitary, globose, sessile, hollowed at the base; albumen pitted; embryo elongate, cylindric or curved, horizontal.—*DISTRIB.* Species about 80, chiefly tropical, a few in Japan, extra-tropical Africa, Australia and New Zealand. All our species belong to Mez' genus *Rapanea*.

Arrested branches bearing the umbels very short, .1 in. long or under :—

Leaf-nerves and reticulations obscure, leaves small, under 2.5 in. 1. *M. arenis*.

Leaf-nerves and reticulations visible, leaves usually over 2.5 in. :—

Leaves under 4 in. long, chartaceous, blackish when dry;

pedicels short, .1 in. long .. ..

2. *M. Porteriana*.

Leaves over 4 in. long, coriaceous, reddish when dry; pedicels

over .15 in. long .. ..

3. *M. perakensis*.

Arrested branches bearing the umbels .3 in. long or more :—

Leaves rounded at apex; berry .2 in. in diam. ..

4. *M. Wrayi*.

Leaves emarginate at apex; berry .3 in. in diam. ..

5. *M. umbellulata*.

1. MYRSINE AVENIS, A. DC. in Trans. Linn. Soc. XVII. 107 (1834). A small tree; branches pale, rounded; branchlets wrinkled when dry, faintly ferruginous-tomentose, leaf-buds long acuminate. *Leaves* entire, chartaceous; oblong-lanceolate, bluntly acute at apex, acutely narrowed at base, glabrous, marked with resinous often very conspicuous lineoles and dots along the margin especially near the apex, margins usually recurved; 1 to 2.5 in. long, .5 to .75 in. broad; mid-rib prominent, impressed above; main-nerves very obscure as are the reticulations; petiole .2 in. long, slender, edged with the ciliate margins of the decurrent blade. *Flowers* in compact sessile 2-5-flowered umbels on very short thick arrested branches; bracts oblong acute; pedicels about .1 in. long, angular; flower-buds ovate, flowers 5-merous. *Calyx-lobes* triangular, acute, ciliate, with few round glandular dots; tube as long as lobes. *Corolla-lobes* imbricate, elliptic, pubescent on the margins, sparsely round-gland-dotted, connate for about one-third of their length. *Stamens* as long as corolla-lobes; anthers



ovate, apiculate, pubescent at tip; filaments and lower part of anthers attached about half-way up the corolla-lobes. *Ovary* rounded, conical; style short in ♂, oblique and with long channelled stigma in ♀. *Berry* globose, .1 in. in diam., glandular, smooth, tipped with the persistent style. DC. Prod. VIII. 96; Miq. Pl. Jungh. 189, and Fl. Ind. Bat. II. 1015; Scheff. Myrs. 47; Koord. & Val. Bijdr. V. 234. *Myrsine capitellata*, Wall. var. *avenis* Clarke in Hook. f. Fl. Br. Ind. III. 512 (*in part*); Stapf in Trans. Linn. Soc. Ser. 2, IV. 199. *Ardisia avenis*, Blume Bijdr. 691. *Rapanea avenis*, Mez Monog. Myrs. 357.

SINGAPORE: *Ridley* 253.—DISTRIB. Java, Celebes, Borneo.

2. *MYRSINE PORTERIANA*, Wall. Cat. 6525 (1829). A shrub or small tree; branches grey, rough; branchlets slender, angled when dry, leaf-buds lanceolate. *Leaves* chartaceous, entire; oblong-lanceolate, bluntly acute and slightly emarginate at apex, cuneately narrowed at base, glabrous, glandular dotted, especially along the margin, and often glandular-lineolate, black or greyish when dry; 1.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerves 8 to 12 pairs, the lowest pair running parallel to the midrib and there joined by the rest, not always easily seen; secondary nerves few, slender, reticulations minute; petiole slender, .2 to .4 in. long, channelled above by the decurrent and almost connivent, slightly fimbriate, edges of the blade. *Flowers* in compact sessile umbels on the summit of a short thick cone-like bracteate arrested branch about .1 to .3 in. long; bracts ovate, bracteoles oblong, blunt, ciliate; pedicels angled .1 in. long; flower-buds ovate, flowers greenish-white, usually dioecious, 5-merous. *Calyx-lobes* ovate acute, .05 in. long, ciliate, marked with prominent dark round or lineolate glands; tube as long as lobes. *Corolla-lobes* oblong obtuse, .1 to .15 in. long, minutely pubescent on the margins, marked by prominent dark rounded and lineolate glands, connate to one-fourth of their length, revolute in flower. *Stamens* inserted on the corolla, the filaments and lower half of the anthers adnate with it, those of ♂ flowers ovate apiculate, those of ♀ flowers sagittate; in open flowers exsert, longer than the revolute lobes. *Ovary* ovoid, glabrous, ♂ flowers with a short straight style, ♀ flowers with an oblique style and oblique folded stigma. *Berry* globose, glabrous, .1 in. in diam., dark blue when fresh, pale when dry, striate from the elongated vertical glands. A. DC. in Trans. Linn. Soc. XVII. 106, Prod. VIII. 95. *M. capitellata* var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (*in part*). *Rapanea Porteriana*, Mez Monog. Myrs. 358.

PENANG: *Porter* in *Wallich* 6525; *Maingay* (K.D.) 1005; *Curtis* 1013, 3728, on Government Hill, road to Crag. PERAK: *Ridley* 2992; *Wray* 678, 1537; *King's Collector* 5001, usually at 5,000 feet eleva-

tion. PAHANG: *Ridley* 1669A. SELANGOR: *Ridley* 8208. MALACCA: *Griffith* (K.D.) 3543; *Ridley* 10076, on Mount Ophir.

3. *MYRSINE PERAKENSIS*, King & Gamble, n. sp. A tree; branchlets thick, smooth, wrinkled when dry, terminal leaf-buds lanceolate. *Leaves* entire, coriaceous; oblong, bluntly acute at apex, narrowed at the base, glabrous, shining above, margins recurved, glandular dots many, inconspicuous; 4 to 5 in. long, 1.5 to 2 in. broad; midrib thick, very prominent; main-nerves 20 to 26 pairs, prominent above, at about two-thirds of a right angle with the midrib, parallel at first, arching afterwards to meet near the margin; secondary nerves similar but more slender, reticulations prominent; petiole .3 in. long, very thick, winged by the decurrent margins of the blade. *Flowers* in compact sessile umbels on the summit of a thick, cone-like, bracteate, arrested branch about .1 in. long, in the axils of the leaves or below them on the current year's wood, so forming a thick cluster below the terminal leaves: umbels 5-8-flowered, pedicels .15 to .2 in. long, thick and angular when dry; bracts ovate, scaly, sometimes ciliate. *Calyx-lobes* ovate acute, glandular-ciliate, about .05 in. long, ciliæ jointed. *Corolla* and *Stamens* unknown. *Berry* globose, sometimes conical at top, .1 to .15 in. in diam., pericarp pale brown when dry, striate with obscure oblong glands.

PERAK: *Wray* 3856; *Scortechini*, 766, at 5,000 feet elevation.

4. *MYRSINE WRAYI*, King & Gamble, n. sp. A tree; branchlets stout, striate when dry. *Leaves* entire, coriaceous; elliptic-oblong, rounded at the apex, narrowly cuneate at base; 3 to 5 in. long, 1 to 1.75 in. broad, glabrous; midrib slender; main-nerves very obscure, about 12 pairs, meeting in an intramarginal nerve near the edge, reticulations many, somewhat raised beneath when dry; petiole .5 to .7 in. long, bordered above by the decurrent margins of the blade, wrinkled at the base. *Flowers* in peduncled axillary few-rayed umbels; bracteoles minute, triangular; peduncles .3 to .5 in. long; rays of umbel 3 to 4, pedicels about .35 in. long, clavately thickened above. *Calyx-lobes* triangular-ovate, glandular-ciliate, acute, .05 in. long. *Corolla* and *Stamens* unknown. *Fruit* round, .2 in. in diam., crowned by the persistent base of the style; pericarp rugosely striate.

PERAK: *Wray* 232, at 4,500 feet.

5. *MYRSINE UMBELLULATA*, A. DC. in Trans. Linn. Soc. XVII. 135. (1834). A small tree; branchlets thick, glabrous, reddish-brown. *Leaves* entire, coriaceous; elliptic-obovate, obtuse and emarginate at apex, acute at the base; glabrous above, rusty beneath, black glandular dots frequent, margins often recurved; 2 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent, slender; main-nerves inconspicuous, slender, raised on upper surface, depressed on lower, reticulations obscure;

petiole .3 to .5 in. long, rugose, bordered above by the decurrent margins of the blade. *Flowers* in axillary scattered umbels on thick cone-like bracteate arrested branches, about .15 in. long; pedicels very slender, .3 to .4 in. long, glabrous. *Calyx-lobes* ovate, acute, very shortly ciliate, minute, recurved in fruit. *Corolla* and *Stamens* unknown. *Berry* globose, .3 in. in diam., smooth, pale when dry, crowned with the persistent style. A. DC. Prod. VIII. 95; Miq. Fl. Ind. Bat. II. 1014. *M. capitellata*, var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (in part). *Embelia umbellulata*, Wall. Cat. 2312. *Rapanea umbellulata*, Mez Monog. Myrs. 362.

SINGAPORE: Wallich 2312.—DISTRIB. Sumatra, Borneo.

### 3. EMBELIA, Burm.

Small trees or shrubs, usually climbing, often extensively. *Leaves* alternate, entire, dentate or serrulate, usually glandular, petiole often margined. *Flowers* in axillary or terminal racemes, simple or paniculate, white or pink, hermaphrodite or polygamo-dioecious. *Calyx* free, 4-5-lobed, persistent, the lobes rounded or ovate. *Corolla* 4-5-lobed, the lobes imbricate or contorted, tube none or short. *Stamens* 4 to 5; filaments short or elongate, inserted on the corolla; anthers ovate-oblong, obtuse or acute; staminodes none. *Ovary* ovoid, globose or conical; style short; stigma capitate; ovules few, inserted on a subglobose placenta. *Fruit* a small drupe, globose, 1-seeded, crowned by the persistent style. *Seed* ovoid, hollowed at the base, albumen pitted, embryo transverse, curved.—DISTRIB. About 60 species, in the tropical regions of the Old World.

Inflorescence terminal or terminal and axillary, paniculate:—

Petals free (Sect. I. EUEMBELIA):—

Leaves membranous or chartaceous:—

Main-nerves of leaves slender, not prominent:—

Petals sparingly villous, anthers with a cluster of black warts behind .. .. . 1. *E. Ribes*.

Petals densely villous, anthers with only small glandular warts behind:—

Leaves elliptic, 1.5 to 2 in. broad, shortly acuminate.. 2. *E. canescens*.

Leaves oblong, .75 in. broad, long but obtusely acuminate 3. *E. dasythyrsa*.

Main-nerves of leaves prominent:—

Branches slender, leaves lanceolate acuminate, flowers densely villous .. .. . 4. *E. Scortechinii*.

Branches stout, leaves suddenly acuminate, flowers glabrous or slightly pubescent only .. .. . 5. *E. penangiana*.

Leaves coriaceous:—

Panicles long, leaves moderately thick:—

Leaves acute or cuneate at base, main-nerves conspicuous, bracteoles as long as the pedicels .. .. . 6. *E. pergamacea*.

- Leaves rounded or cordate at base, main-nerves very prominent, bracteoles shorter than the pedicels .. 7. *E. coriacea*.  
 Panicles short, stout, leaves very thick .. 8. *E. angulosa*.  
 Petals joined at the base into a tube (Sect. II. GRENACHERIA):—  
 Leaves rusty-villous beneath, bracts of the inflorescence short, inconspicuous .. 9. *E. Lampani*.  
 Leaves pubescent or nearly glabrous beneath, bracts of the inflorescence long, often leafy, conspicuous .. 10. *E. amentacea*.  
 Inflorescence axillary:—  
 Inflorescence paniculate, axillary, 1 to 2 in. long (Sect. III. PATTARA) .. 11. *E. Ridleyi*.  
 Inflorescence much shorter than the leaves, on very short racemose branchlets with many bracts (Sect. IV. MICREMBELIA):—  
 Flowers tetramerous, leaves coriaceous .. 12. *E. Myrtillus*.  
 Flowers pentamerous, leaves chartaceous .. 13. *E. parviflora*.  
 SPECIES IMPERFECTLY KNOWN: 14. *E. lucida*. 15. *E. macrocarpa*.

1. *EMBELIA RIBES*, Burm. Fl. Ind. 62. t. 23 (1768). An evergreen climbing shrub; branches pale brown, with thick bark studded with conical protuberances; branchlets pale brown, smooth, lenticellate. *Leaves* entire, chartaceous; elliptic or elliptic-lanceolate, obtusely acuminate at apex, cuneate at base; glabrous above, glabrous or minutely pubescent beneath, glandular dots scattered, sometimes obscure; margin generally recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, prominent below, generally impressed above; main-nerves obscure, irregular, slender, 12 to 14 pairs, parallel at first then curved upwards to join near the margin; secondary nerves many faint, reticulations very obscure; petiole .3 to .5 in. long, bordered by the crisped edges of the decurrent blade. *Inflorescence* a large terminal leafy 3-pinnate grey- or rusty-pubescent panicle of racemes, the branches at first turning upwards, afterwards nearly at right angles with the rachis; bracts leafy, smaller by degrees upwards; bracteoles subulate, shorter than the slender pedicels, .05 in. long; buds small, globose; flowers white. *Calyx-lobes* very minute, about .025 in. long, triangular-acute, ciliate, with few glandular dots; tube as long as lobes. *Corolla-lobes* free, elliptic, rounded at top in ♀, more acute in ♂, .05 in. long, ciliate, sparingly villous-pubescent, apex incurved, with few prominent glandular dots. *Stamens* inserted on the corolla-lobes, about half-way up in ♂, lower down in ♀, shorter than the lobes; anthers short, ♂ with parallel, ♀ with divaricate, cells, both with a long black mass of glandular warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous; style short, stigma capitate in ♂, peltate and larger in ♀. *Berry* globose or sometimes pyriform, red or black, glabrous, succulent, wrinkled when dry, aromatic, .1 to .15 in. in diam., crowned with the persistent style and



stigma. Retz. Obs. iv. 24; Lamk. Ill. t. 133; Roxb. Fl. Ind. i. 586; Wall. Cat. 2304; A. DC. in Trans. Linn. Soc. XVII. 129, Prod. VIII. 85 (part); Scheff. Myrs. 38; Miq. Fl. Ind. Bat. II. 1011; Dalz. & Gibs. Bomb. Fl. 137; Brandis For. Fl. 284; Kurz For. Fl. II. 101; Clarke in Hook. f. Fl. Br. Ind. II. 513; Trimen Fl. Ceyl. III. 69; Cooke Bomb. Fl. II. 84; Mez Monog. Myrs. 303; Prain Beng. Pl. 643. *E. Burmannii*, Retz Obs. IV. 23. *E. garciniaefolia*, Wall. Cat. 2304c and e; Miq. l.c. 1011; Scheff. Myrs. 40. *E. sumatrana*, Miq. l.c. 1012. *E. glandulifera*, Wight Ic. 1207; Dalz. & Gibs. Bomb. Fl. 137. *Samara Ribes*, Kurz in Journ. As. Soc. Beng. XLVI. 222. *Ardisia tenuiflora*, Bl. Bijdr. 687.

PENANG: *Deschamps, Curtis*. PERAK: *Wray* 420; *Scortechini*; *King's Collector* 928, 1150, 6999 (abnormal state, most of the flowers converted into leafy bracts). MALACCA: *Griffith* (K.D.) 3550; MAINGAY (K.D.) 1002; *Cuming* 2320. JOHORE: *Native Collector* 3749. SINGAPORE: *Ridley* 10643, 2803 (fruits converted into insect galls); *Kurz* 2965.—DISTRIB. India, Burma and Ceylon; Malay Islands and eastwards to South China.

VAR. *rugosa*, King & Gamble. Branchlets dark brown, much wrinkled and with oblong lenticels. *Leaves* 4 to 5 in. long, 1.5 to 2 in. broad, usually thicker than the type. *Racemes* less pubescent than in type, the flowers often collected near the ends of the ultimate branches of the inflorescence. *Stamens* of ♂ flowers exsert. *Stigma* of ♀ much larger than that of ♂ flowers, peltate. *Berry* rugose, conically tipped; pericarp thick, fleshy, with cavities.

PERAK: *Wray* 2278, 2576, 3069; *King's Collector* 2512, 3001, 4040. SINGAPORE: *Ridley* 10384.

We find no Malay specimens with the large glandular pits so well marked in South Indian specimens (*Embelia glandulifera*, Wight Ic. 1207). Wight's figure is not well drawn in several respects, and especially as to the nervation of the leaves, so it is not very easy to make sure about it, but there seems no reason to separate *E. glandulifera* from *E. Ribes* unless perhaps as a variety. It has usually a much shorter and fewer-flowered inflorescence.

2. *EMBELIA CANESCENS*, Jack; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 292 (1824). A climbing shrub with slender, villous, subflexuose branches. *Leaves* entire, chartaceo-membranous; elliptic, shortly acuminate at apex, rounded or sub-cordate at base, glabrous or slightly pubescent and shining above, canescent beneath; glandular dots many, not prominent, in the areoles of the reticulations; 2 to 3.5 in. long, 1.5 to 2 in. broad; midrib prominent, impressed above, villous beneath; main-nerves about 10 pairs, irregular, curving upwards to join at some distance from the margin; secondary nerves many, slender,

reticulations irregular; petiole .3 to .4 in. long, bordered above by the prominently crispate edges of the decurrent blade, rugose beneath. *Inflorescence* a slender terminal 3-pinnate leafy panicle of distant comparatively few-flowered racemes, 4 to 8 in. long; rachis and its branches densely rusty-villous; bracts leafy below, spathulate above, bracteoles subulate, deciduous, about half as long as the .05 to .1 in. long pedicels which are longer in fruit; buds very minute, globose. *Calyx-lobes* very small, triangular, pubescent; tube as long as lobes. *Corolla-lobes* oblong, free, blunt, .06 in. long, densely villous without, papillose within and glandular-dotted. *Stamens* shorter than the corolla-lobes, inserted near their base; anthers rounded, warted with inconspicuous glands behind at the insertion of the dorsifixed filaments. *Ovary* in ♂ flower rudimentary. *Berry* globose, somewhat conical above, rugose when dry, crowned with the remains of the persistent style, .2 in. in diam. Wall. Cat. 2311; A. DC. Prod. VIII. 85; Scheff. Myrs. 42; Miq. Fl. Ind. Bat. II. 1012; Clarke in Hook. f. Fl. Br. Ind. III. 514; Mez Monog. Myrs. 305.

PENANG: Jack; Porter. PERAK: Ridley 7172 (part). MALACCA: Maingay (K.D.) 1004. SINGAPORE: Goodenough 2804; Hullett 115.

3. *EMBELIA DASYTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub; branches minutely pubescent, striate, with prominent raised lenticels; branchlets dark, slender, rusty-villous. *Leaves* entire, chartaceous; oblong or elliptic-oblong, bluntly acuminate at apex, rounded at base; glabrous above, glabrous except on the midrib beneath, glandular dots scattered, obscure; 1.5 to 2 in. long, about .75 in. broad; midrib prominent beneath, villous, impressed above, main-nerves 10 to 12 pairs, irregular, arching upwards to meet near the margin; secondary nerves few, slender, reticulations obscure; petiole .1 to .2 in. long, channelled above. *Inflorescence* a long, 3-pinnate, leafy panicle of long slender many-flowered racemes, rachises minutely pubescent; bracts leafy, bracteoles subulate, minute, much shorter than the .1 in. long very slender pedicels; buds globose shaggy, flowers grey. *Calyx-lobes* minute, about .03 in. long, triangular, ciliate; tube shorter than lobes. *Corolla-lobes* free, ovate-spathulate, about .06 in. long, black-gland-dotted, densely covered with short moniliform hairs. *Stamens* less than half the length of the corolla-lobes, inserted at the base; anthers reniform, with inconspicuous glandular warts on the back at the insertion of the dorsifixed filaments, which are almost shorter than the anthers. *Ovary* ovoid, style very short, stigma in ♂ small capitate, in ♀ peltate, large. *Berry* red or black, .15 in. in diam., globose or slightly pyriform, wrinkled when dry, tipped by the persistent style and stigma. Scheff. Myrs. 42; Mez Monog. Myrs. 305.

PERAK: Wray 1924; *Scortechini* 498; *King's Collector* 776, 4103, 4375, 5102, 5762, 6640, 8583, 10024, 10701, clinging to trees in dense jungle at low levels. SELANGOR: *Ridley* 7572. SINGAPORE: *Hullett* 118.—DISTRIB. *Bangka*, *Teysmann* Hort. Bogor. No. 3189, at *Djeboes*.

Only one very poor specimen of the type (*Teysmann's*) is available, but from an examination of it and from *Miquel's* description it seems to be right to refer the Peninsular plant, which we had considered new, to this species.

4. *EMBELIA SCORTECHINII*, King & Gamble, n. sp. A climbing shrub (?); branches slender; ultimate branchlets reddish, rusty-villous. *Leaves* entire, chartaceous; elliptic-lanceolate, long acuminate at apex, narrowed at base; glabrous above, grey-pubescent on the nerves beneath and with minute white scales, glandular dots obscure; 4 to 5 in. long, 1.5 to 2 in. broad; midrib very prominent, impressed above; main-nerves about 8 pairs, prominent, slender, curving upwards to and along the margin; reticulations many, prominent on the upper surface; petiole .2 in. long, pubescent. *Inflorescence* of slender rusty-villous panicles of long racemes, the panicles 7 to 10 in. long, racemes 3 to 6 in.; rachis hirsute, somewhat angular; bracts deciduous, bracteoles very minute, subulate; buds very small, globose. *Calyx-lobes* ovate, rounded, very minute, the edges ciliate with long moniliform hairs, tube very short. *Corolla-lobes* oblong, acute, .05 in. long, shaggy with long moniliform hairs. *Stamens* shorter than the corolla-lobes; anthers ovate, cordate, with two prominent papillose warts behind at the insertion of the dorsifixed very short filaments. *Ovary* ovoid, style conical. *Berry* not known.

PERAK: *Scortechini*.

This interesting species is characterised by the abundant moniliform hairs on the flowers, longer and more conspicuous than in other species.

5. *EMBELIA PENANGIANA*, Mez Monog. Myrs. 311 (1901). A climbing shrub, stem reaching about 1 in. in diam.; branches stout; ultimate branchlets red, striate, lenticellate. *Leaves* entire, chartaceous; elliptic, shortly acuminate at apex, narrowly cuneate at base; glabrous, not gland-dotted; 3.5 to 4.5 in. long, 1.5 to 2 in. broad; midrib prominent, impressed above; main-nerves 10 to 12 pairs, irregular, slender, at about two-thirds of a right angle with the midrib at first then arching upwards to join near the margin; secondary nerves similar but less prominent, reticulations many; petiole .5 in. long, slender, edged by the crispate decurrent margins of the blade which are often connivent above. *Inflorescence* a terminal 3-pinnate leafy panicle, 6 to 9 in. long, of slender racemes; rachis slightly pubescent, main branches at about half a right angle with rachis; peduncles about 1 in. long, upper branches and branchlets usually at right angles; bracts lanceolate spatulate, leafy, deciduous;

bracteoles subulate, as long as or rather longer than the very short, under .05 in. long pedicels; buds very small, globose, flowers red. *Calyx-lobes* orbicular, glandular-ciliate, .05 in. long, connate to the middle, not gland-dotted. *Corolla-lobes* 5, free, ovate, rounded at apex, .075 to .1 in. long, slightly pubescent without, papillose within, not gland-dotted. *Stamens* of ♂ flowers equal to or longer than the corolla-lobes, of ♀ flowers shorter than them, inserted near the base of the lobes; anthers oblong, emarginate, with minute black warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous, style very short, stigma peltate. *Berry* globose, red, tuberculate and corrugate, .1 in. in diam., fruiting pedicels as long as berry. *Embelia Ribes* var. *penangiana*, Oliv. in Hook. Ic. Pl. t. 1597.

PENANG: Curtis 306. PERAK: Wray 1375, 1409; Scortechini; King's Collector 3637, 10739.

A well-marked species, distinguished by the fairly prominent nerves of the leaves, the very short pedicels, and the absence of glandular dots.

6. *EMBELIA PERGAMACEA*, A. DC. Prod. VIII. 85 (1844). A slender climbing shrub; branches rather thick, branchlets wrinkled and angular when dry. *Leaves* entire, coriaceous; oblong-lanceolate, acuminate at apex, cuneate or acute at base; glabrous, shining above, pale beneath, margins recurved, glandular dots many, hardly prominent; 3 to 5 in. long, 1.5 to 2 in. broad, midrib thick, impressed above; main-nerves slender 12 to 14 pairs, parallel but irregular, raised and conspicuous on the upper surface, leaving the midrib at about two-thirds of a right angle and joining near the edge in an intramarginal nerve; secondary nerves many, parallel to the main-nerves, reticulations obscure; petiole .3 in. long, angular, channelled above when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal, pyramidal, 4-pinnate, nearly glabrous, leafy panicle with racemose branchlets and very numerous flowers; main rachis thick, flattened above, branches nearly at right angles to rachis as again are the branchlets, all angular; bracts ovate spatulate, leafy, bracteoles subulate acuminate as long as the pedicels; pedicels .05 in. long, somewhat longer in fruit; buds very small, globose, flowers light red. *Calyx-lobes* minute, about .04 in. long, broadly triangular, acute, glandular-ciliate, papillose on both sides, dotted with few large and small brown and black glands, tube as long as lobes. *Corolla-lobes* free, ovate-oblong, glandular-ciliate, glabrous without, papillose within, dotted in upper part only, .07 in. long. *Stamens* as long as or shorter than corolla-lobes, inserted half-way up; anthers ovate cordate, emarginate, black-warted behind at the insertion of the dorsifixed filaments. *Ovary* glabrous, ovoid; style thick very



short; stigma capitate. *Berry* globose, blue when ripe, wrinkled when dry, .06 in. in diam., crowned with the persistent style, gland-dotted. Miq. Fl. Ind. Bat. II. 1012; Scheff. Myrs. 34; Mez Monog. Myrs. 310. *Ardisia pergamacea*, Bl. fide A. DC.

PERAK: *Curtis* 2029; *Wray* 2001; *King's Collector* 3658, 4678, 6412.—DISTRIB. Java; Borneo.

This species closely resembles *E. coriacea*, but differs in the acuminate leaves, very shining above and prominently nerved; in the papillose calyx-lobes, petals dotted only in the upper part and bracteoles as long as the pedicels.

7. *EMBELIA CORIACEA*, Wall. Cat. 2314 (1829). A climbing shrub; branches reaching 1.5 in. in diam.; branchlets reddish, twisted, somewhat angular, roughly lenticellate. *Leaves* entire, coriaceous; oblong or oblong-lanceolate, obtusely acute at apex, rounded or almost cordate or auricled at base; glabrous, more or less shining above, brownish beneath, glandular dots scattered, not prominent, margin sometimes incurved; 3 to 10 in. long, 1.5 to 4 in. broad; midrib thick, impressed above; main-nerves many, slender, not prominent, irregularly parallel, at about two-thirds of a right angle with the midrib, joining in an intramarginal faint nerve; secondary nerves many, slender, reticulations faint; petiole thick, .3 to .7 in. long, channelled when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal 4-pinnate spreading leafy rusty-pubescent panicle with racemose branchlets and very numerous flowers; main rachis thick, somewhat flattened, branches nearly at right angles to rachis as again are the branchlets; bracts leafy, decreasing upwards; bracteoles minute, subulate, about half the length of the pedicels; pedicels .05 in. long; buds very small, globose, flowers grey. *Calyx-lobes* 5, minute, triangular, glabrous, dotted with very few (3 to 5 per lobe) brown or black glands; tube as long as lobes. *Corolla-lobes* free, 4–5, ovate, blunt, recurved, glabrous without, slightly papillose within, gland-dotted all over. *Stamens* shorter than the corolla-lobes, inserted on them about half-way up; anther-cells oblong, somewhat divaricate, with about 4 black warts behind at the insertion of the short filaments. *Ovary* ovoid, style very short, stigma capitellate. *Berry* globose, smooth, .075 to .1 in. in diam., pale, prominently gland-dotted, wrinkled when dry, crowned with the persistent base of the style. A. DC. in Trans. Linn. Soc. XVII. 135, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 513; Mez Monog. Myrs. 313. *E. oblongata*, Miq. Fl. Ind. Bat. Suppl. 573; Scheff. Myrs. 34. *E. macrophylla*, Bl.; Scheff. Myrs. 36.

PENANG: *Wallich* 2314; *Curtis* 1047. PERAK: *Curtis* 1307; *Derry* 11712; *Wray* 2001, 2579, 3238; *Scortechini* 117, 255; *King's Collec-*

tor 2278, 3481, 4976, 5056, 5254, 5323, 6231, 6766, 7857, 10015, 10543. PAHANG: *Ridley* 5828. SELANGOR: *Ridley* 7562. MALACCA: *Maingay* (K.D.) 1018; *Ridley* 11135. SINGAPORE: *Ridley* 2812.—DISTRIB. Sumatra; Java; Borneo, *Beccari* 767, 878, 1189, 2561, 3922; *Haviland* & *Hose* 3469.

8. *EMBELIA ANGULOSA*, King & Gamble, n. sp. A climbing shrub; branches thick, branchlets wrinkled when dry, lenticels few. *Leaves* entire, coriaceous; ovate, obtuse, emarginate, glabrous, shining above, dull beneath, glandular dots pitted on both surfaces; 2 to 3.5 in. long, 1 to 2 in. broad; midrib very thick and prominent, impressed above; main-nerves 14 to 16 pairs, slender, irregular, leaving the midrib at nearly a right angle, then curved and joining near the margin, raised on upper surface; secondary nerves many, slender, reticulations obscure; petiole .2 in. long, channelled above and bordered by the crispate edges of the decurrent blade. *Inflorescence* a dense terminal glabrous stiff panicle about 4 in. long and broad, of racemes, the rachises sharply angled; bracts leaf-like, spathulate, bracteoles very small, subulate; pedicels .05 in. long, thick, angular, glabrous or minutely pubescent, equal to or shorter than the bracteoles; buds globose. *Calyx-lobes* ovate, ciliate, minute, .03 in. long, not gland-dotted. *Corolla-lobes* free, ovate, acute, .075 in. long, nearly glabrous outside, papillose within. *Stamens* shorter than corolla-lobes, inserted one-third up, reniform, with inconspicuous black dots at the insertion of the short dorsifixed filaments. *Ovary* ovoid glabrous; style very short; stigma peltate. *Berry* red, ovoid, somewhat pyriform, ribbed and gland-dotted, glabrous, crowned with the remains of a cylindric style and capitate stigma. *E. coriacea*, Stapf in Trans. Linn. Soc. Ser. ii. IV. 200 (not of A. DC.)

PERAK: *Wray* 1524—on Ulu Batang Padang at nearly 5,000 ft.—DISTRIB. Borneo, *Haviland* No. 1152, on Mt. Kinabalu at 7,600 to 8,800 feet.

The description of the flowers is taken from *Haviland's* Borneo specimen, the rest from *Wray's*.

9. *EMBELIA LAMPANI*, Scheff. Myrs. 37 (1867). A slender climbing shrub, clinging to trees; branches reddish-brown, rough with strigose hairs, lenticellate; branchlets rusty-villous-hairy. *Leaves* chartaceous; oblong, obtuse or emarginate at apex, rounded or cordate at base; margins recurved, upper surface glabrous except on the midrib, lower surface rusty-villous, glandular dots many, scattered; 1.5 to 3.5 in. long, 1 to 1.5 in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves many (up to 24 pairs), irregular, at about two-thirds of a right angle with the midrib, straight at first then curving

upwards to meet in a nerve more or less parallel to the margin; secondary nerves similar, reticulations many; petiole .1 to .2 in long, rusty-villous. *Inflorescence* of terminal panicles of pedunculate racemes 6 to 12 in. long, the branches often leafy, rachis and peduncles all rusty-villous; peduncles .5 to .7 in. long, pedicels slender, about .05 in. long; bracts few, leaf-like; bracteoles rather longer than the pedicels, lanceolate to spathulate; flowers small, buds globose, petals white, striate, tube red. *Calyx-lobes* 5-6, ovate, acute, ciliate on the edges, villous, dotted with few glands; tube as long as lobes, both together .05 in. long, longer in fruit. *Corolla* gamopetalous from one-third to one-half of its length; lobes oblong, obtuse, recurved, .1 in. long, sparsely gland-dotted. *Stamens* as long as or a little shorter than the corolla-lobes, inserted about halfway up, anthers oblong, dehiscing longitudinally, the back with black conspicuous glandular warts; filaments adnate to the corolla below point of insertion, slender, dorsifixed. *Ovary* rounded, glabrous, style cylindric, stigma peltate in ♀, slightly lobed in ♂. *Berry* globose, .1 to .15 in. in diam., black when dry, crowned with the persistent style, rugosely glandular. Clarke in Hook. f. Fl. Br. Ind. III. 514. *E. villosa*, Wall. Cat. 2313 (in part). *Grenacheria Wallichiana*, Mez Monog. Myrs. 293, fig. 49. *G. Lampani*, Mez l.c. 294.

PENANG: *Curtis* 305; *G. King*. PERAK: *Wray* 95, 2784; *Scortechini* 231; *King's Collector* 2483, 4210, 6849, 8134. SELANGOR: *Ridley* 10224. MALACCA: *Maingay* (K.D.) 1003. SINGAPORE: *Ridley* 10417.—DISTRIB. Sumatra, *Korthals*; Borneo, *Haviland & Hose*.

Haviland and Hose's Borneo specimens have rather larger flowers than, and pedicels about twice as long as, those from the Peninsula (No. 2280).

10. *EMBELIA AMENTACEA*, Clarke in Hook. f. Fl. Br. Ind. III. 514 (1882). A slender climbing shrub; branches pale brown, velvety; branchlets cinnamomeous or rusty-villous. *Leaves* chartaceous; oblong or obovate-oblong, obtuse and sometimes emarginate at apex, rounded at base; upper surface sparsely pilose, under surface pubescent, pale bluish-green, glandular dots many prominent; 2 to 3 in. long, .75 to .1 in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves few, 6 to 10 pairs, irregular, at about two-thirds of a right angle with the midrib, arching upwards, branching and joining in a nerve near the margin; secondary nerves similar but more slender, reticulations not prominent; petiole .15 in. long, villous, winged by the decurrent base of the blade. *Inflorescence* of terminal panicles of pedunculate racemes, the branches leafy, the leaves passing gradually into oblong or spathulate conspicuous bracts; peduncles 1 to 1.5 in. long, enlarged at base; pedicels .1 in. long, supported by linear subulate bracteoles twice their

length, so that when in bud the racemes have the appearance of catkins; flowers very small, buds globose. *Calyx-lobes* 5, acute, ciliate on the edges, gland-dotted, tube as long as lobes, both together .05 in. long. *Corolla* very shortly gamopetalous; lobes 5, ovate, obtuse, glabrous within, .05 in. long. *Stamens* very short, shorter than corolla-lobes, inserted about half-way up; anthers oblong, rounded, with black papillose warts on the back; filaments as long as anthers, dorsifixed. *Ovary* rounded, glabrous, conical above, style slender, stigma peltate. *Berry* globose, wrinkled when dry, .1 to .125 in. in diam., crowned with the persistent style and stigma, black when dry. *Grenacheria amentacea*, Mez Monog. Myrs. 294.

PERAK: *Scortechini* 802; *Ridley* 7172 (part); *King's Collector* 5055, 6280, 6817, 8692—in open ground and in bamboo forests. SELANGOR: *Ridley* 7561, *Native Collector* 2802A, *Goodenough* 10555. MALACCA: *Griffith* (K.D.) 3548.

Mez suggests that this may be a young state of *Grenacheria Wallichiana*. He apparently saw only Griffith's specimen. The abundant material now available clearly shows that Clarke correctly considered it as separate. The curious catkin-like young inflorescence and the more sparse leaf-venation distinguish it.

11. *EMBELIA RIDLEYI*, King & Gamble, n. sp. A climbing (?) shrub; branchlets light brown, wrinkled. *Leaves* chartaceous; oblong, acute at apex, rounded at base; glabrous, glandular dots scattered obscure, margin somewhat recurved; 4 to 7 in. long, 1.5 to 3 in. broad; midrib thick, prominent below; main-nerves prominent below, about 12 pairs, curving upwards and meeting in a looped intramarginal nerve; secondary nerves and reticulations faint; petiole .5 in. long, thick. *Inflorescence* an axillary panicle of racemes, the branches curved, distant; rachis .5 to 1 in. long, that of racemes shorter, bracteoles minute, triangular; racemes about .5 in. long. *Calyx-lobes* 4 or 5, ovate, gland-dotted, very small. *Corolla* and rest not seen.

SINGAPORE: *Ridley* 6324. It seems to come near to *E. floribunda*, Wall.

*E. Tsjeriam-Cottam*, A. DC. is quoted by Mez as extending from India southwards to Singapore, but we have seen no specimens from our region.

12. *EMBELIA MYRTILLUS*, Kurz in Journ. As. Soc. Beng. XL. ii. 67 (1871), and For. Fl. II. 104. A small climbing shrub (Wray); branches rough, somewhat corky, with large lenticels; ultimate branchlets densely rusty-villous. *Leaves* coriaceous; bifarious, broadly elliptic to almost orbicular, acute at apex with usually 3 terminal teeth, narrowed truncate or cordate at base; glabrous above, slightly villous on nerves beneath; glandular dots black, numerous, small, fewer large, scattered, especially



near the apex and along the margin, which is often recurved; .4 to .7 in. long, .3 to .6 in. broad; midrib prominent; main-nerves 6 pairs, arched upwards and joining in an intramarginal nerve; secondary nerves similar, reticulations prominent; petiole .1 in. long, villous. *Flowers* tetramerous, very small, in umbels or very short racemes on short axillary arrested branches, .1 to .15 in. long, shorter than the leaves; bracts minute, subulate. *Calyx-lobes* ovate, glandular ciliate, densely papillose within, .05 in. long, tube very short. *Corolla-lobes* free, oblong, rounded at apex, .1 in. long, glandular-ciliate on the edges, conspicuously marked with black, oblong or linear glands. *Stamens* longer than the corolla-lobes in ♂ flowers, shorter in ♀; anthers oblong, often cordate, with conspicuous warts at the insertion of the dorsifixed filaments which spring from the base of the petals. *Ovary* ovoid; style slender; stigma capitate, 4-cleft. *Berry* globose, red or black, .15 to .2 in. in diam., prominently gland-dotted, tipped with the persistent style and stigma. Clarke in Hook. f. Fl. Br. Ind. III. 516; Mez Monog. Myrs. 322. *Myrsine Myrtillus*, Hook. Ic. Pl. t. 825. *Samara Myrtillus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223.

PERAK: *Scortechini* 762; Wray 1565, 3818, on Gunong Bubu and Gunong Brumber, at 5,000 to 7,000 feet. MALACCA: summit of Mount Ophir, *Griffith* (K.D.) 3542; *Lobb*; *Ridley*.—DISTRIB. Burma, *Griffith*.

13. *EMBELIA PARVIFLORA*, Wall. Cat. 2307 (1829). A slender climbing shrub reaching 60 feet in length; branches and branchlets densely rusty-villous, slender. *Leaves* chartaceous; distichous, ovate, obtusely acute at the apex, truncate at base; glabrous except on the midrib beneath; margin slightly recurved; glandular dots many, prominent, scattered, more numerous towards the apex; .7 to 1.5 in. long, .5 to .75 in. broad; midrib prominent beneath, impressed above; main-nerves 8 to 10 pairs, slender, curving upwards towards the margin; secondary nerves slender, many, reticulations prominent; petiole scarcely .05 in. long, rusty-villous, channelled above. *Inflorescence* of very short axillary few-flowered subumbellate racemes, ♂ 4-6-flowered with .15 in. long slender pedicels, ♀ 1-3-flowered with .05 in. slender pedicels; bracts in both minutesubulate; flowers pentamerous; buds globose. *Calyx-lobes* oblong, fimbriate-ciliate, .05 in. long, with few (about 6) large brown glands, glandular-villous without, tube very short, ciliæ moniliform. *Corolla-lobes* ovate, rounded, ciliate, .075 in. long, .05 in. broad, with few unequal-sized prominent brown glands. *Stamens* in ♂ flowers longer than corolla-lobes, in ♀ much shorter; anthers reniform, in ♂ apiculate and warted at back at the insertion of the dorsifixed, rather long filaments which spring from near the base of the corolla-lobes. *Ovary*

rounded, glabrous; style slender, curved, stigma peltate, at any rate in ♀. *Berry* globose, red, black when dry, smooth, .15 to .2 in. in diam., surmounted by the remains of the style and stigma. A. DC. in Trans. Linn. Soc. XVII. 130 (excl. var. β), Prod. VIII. 86; Scheff. Myrs. 44; Kurz For. Fl. II. 104; Clarke in Hook. f. Fl. Br. Ind. III. 515; Mez Monog. Myrs. 324. *Samara parviflora*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223. *Celastrinea*, Griff. Itin. Notes 85, n. 1226.

PERAK: *Scortechini*; Wray 4194—at Maxwell's Hill, Larút, 3,500 feet; *Curtis* 2059—on Hijan Range; *King's Collector* 2342, 6992—from dense forests on high hills at 3,000 to 5,000 feet.—DISTRIB. Khasia and Naga Hills; Upper Burma, *Griffith* (K.D.) 3545, &c.; Sumatra.

#### IMPERFECTLY KNOWN SPECIES.

14. *EMBELIA LUCIDA*, Wall. Cat. 2315. *Leaves* 3 in. long, 1.25 in. broad, broadly oblong, suddenly narrowed at both ends, entire, glabrous, coriaceous. *Racemes* 1 in. long, axillary, simple, solitary or paired, rusty-villous. A. DC. Trans. Linn. Soc. XVII. 134, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 517; Mez Monog. Myrs. 396.

SINGAPORE: *Wallich* 2315.

15. *EMBELIA MACROCARPA*, King & Gamble, n. sp. A strong climber, branchlets thick, nearly black, rough. *Leaves* coriaceous; elliptic, obtuse or shortly acuminate at apex, almost rounded at base, glabrous, margin reflexed; 6 in. long, 3 to 4 in. broad; midrib rather slender; main-nerves irregular, distant, not prominent, about 8 pairs; secondary nerves slender, obscure as are the reticulations; petiole .7 to 1 in. long, thick, bordered above by the decurrent margins of the leaves. *Flowers* apparently on rather short, thick racemes from the branches. *Calyx-lobes* 4, triangular, acute, gland-dotted, under .1 in. long. *Berry* large, .5 to .7 in. in diam., smooth, wrinkled when dry, globose, crowned with the short remains of the persistent style. *Seed* with many conspicuous pits. Rest not seen.

PENANG: at Marriot's Road, 1,500 feet, *Curtis* 1229.

The following Burmese species is here inserted, as it is found in Tenasserim and may occur further south in the Malay Peninsula.

*EMBELIA GALLATLYI*, King & Gamble, n. sp. Apparently a shrub; branchlets rounded, dark brown, lenticellate. *Leaves* ovate, acuminate at apex, truncate at base; prominently crenate dentate with blunt teeth and glands in the crenatures; glabrous on both surfaces, glandular dots few, chiefly near the margin; 1 to 1.4 in. long, .5 to .7 in. broad; midrib slender, impressed above; main-nerves 10 to 12 pairs; arching upwards to the crenatures; secondary nerves many, slender, reticulations prominent; petiole .1 to .2 in. long, channelled above, crispately edged. *Inflorescence* of axillary corymbose racemes, 10–12-flowered, rachis about 2 in. long, bracts minute subulate,

the whole minutely rusty-pubescent, pedicels slender. *Calyx-lobes* triangular acute .03 to .05 in. long, ciliate; tube as long as lobes or somewhat shorter. *Corolla-lobes* oblong-spathulate, .1 in. long, ciliate, minutely pubescent, sparsely gland-dotted. *Stamens* longer than corolla-lobes, .15 in., anthers oblong, cells parallel, not warted behind at the insertion of the long exsert filaments which spring from close to the base of the corolla-lobes. *Ovary* ovoid-conical, style short curved, stigma minute. *Berry* unknown.

TENASSERIM: at Moolyet, 5,000 feet, *G. Gallatly* No. 407. *Gamble* No. 7906 from Mianimukh, Chittagong Hill Tracts, without flowers or fruit, is probably this species.

#### 4. LABISIA, Lindl.

Small shrubs, with a creeping rhizome and erect stem, resembling *Pothos* in appearance. *Leaves* few, coriaceous, entire or denticulate, sessile or petiolate, the petiole often dilated, main leaf-nerves very many, at right angles to the midrib. *Flowers* hermaphrodite, minute, pink, in axillary spike-like panicles, bracts very small. *Calyx* minute, 5-lobed. *Corolla* 5-lobed, lobes ovate, induplicato-valvate in bud; tube very short. *Stamens* 5, wrapped in the corolla-lobes; filaments very short; anthers ovoid, introrsely dehiscent, no staminodes. *Ovary* globose, attenuated into a short style; stigma small; ovules few, immersed in a globose central placenta. *Fruit* small, globose, red, 1-seeded. *Seed* globose, hollowed at the base; albumen smooth; embryo cylindric transverse. —DISTRIB. About 4 species, all of the Malay Peninsula and Archipelago.

Leaves petiolate without decurrent wings:—

- |   |  |
|---|--|
| Leaf-blades elliptic-lanceolate, much longer than broad | 1. <i>L. pumila</i> var. <i>lanceolata</i> . |
| Leaf-blades ovate or ovate-orbicular, nearly as broad   |  |
| as long.. .. .  | 2. <i>L. paucifolia</i> .                    |

Leaves with winged petioles or sessile:—

- |  |                       |
|--|-----------------------|
| Wings very narrow, blade of leaf acuminate at both |                       |
| ends .. .. .                                       | 1. <i>L. pumila</i> . |

Wings broad:—

- |   |   |
|---|---|
| Leaves crenate, thin, main-nerves rather distant .. | 1. <i>L. pumila</i> , var. <i>alata</i> . |
| Leaves entire, coriaceous, main-nerves very close   |   |
| and regular ... ..                                  | 3 <i>L. longistyla</i> .                  |

1. LABISIA PUMILA, Benth. & Hook. f. Gen. Pl. II. 645 (1876). A semi-herbaceous undershrub, with rooting stems and leaves not jointed at their insertion but decurrent into them. *Leaves* bluish-green, elliptic-lanceolate, acuminate, narrowed at the base, and more or less decurrent on the petiole; crenately toothed, or sometimes nearly entire; blade 5 to 8 in. long by 1 to 2.5 in. broad; midrib thick, often rusty-pubescent; main-nerves extremely numerous, nearly at right angles to the midrib, parallel, slender, anastomosing towards the margin, and

then producing an elegant network; under-surface with brown glandular scales; petiole 1 to 3 in., enlarged at the base, often minutely rusty-pubescent. *Flowers* pink, in a spike-like, long-stalked, ferruginous-tomentose panicle of small corymbose bracteate clusters; peduncles of corymbs 1 in. long or shorter, sometimes none; bract linear-subulate, .05 to 1 in. long.; pedicels .05 to 1 in., slender, with minute bracteoles. *Calyx-lobes* triangular, acute, .025 in. long, densely glandular. *Corolla-lobes* ovate, with linear glands, glabrous. *Stamens* infolded in the corolla; filaments very short; anthers oblong-linear, apiculate, with several hard round or linear black warts on the back. *Ovary* rounded, pubescent, ending in a subulate angular style with minute notched stigma. *Fruit* a globose red berry, about .15 in. in diam., ribbed and with prominent elongate glands, surmounted by the persistent style. Mez Monog. Myrs. 171 (var. *genuina*). *L. pothoina*, Lindl. in Bot. Reg. 31. t. 48; Clarke in Hook. f. Fl. Br. Ind. III. 518; Stapf in Trans. Linn. Soc. Ser. 2, IV. 200; *Ardisia pumila*, Blume Bijdr. 688; A. DC. Prod. VIII. 137; Miq. Pl. Jungh. 199 and Fl. Ind. Bat. II. 1028; Scheff. Myrs. 92. *A. ? spicata*, Wall. Cat. 2273; A. DC. in Trans. Linn. Soc. XVII. 135.

SINGAPORE or PENANG: Walker, 165. PENANG: Curtis 1192; Kunstler 1159. PERAK: Scortechini; Wray 753A. MALACCA: Maingay 1013 (K.D.); Stoliczka. SINGAPORE: Ridley 1804.—DISTRIB. JAVA: Forbes 238, 474. In dense moist forests on the lower slopes of hills.

VAR. *lanceolata*, Scheff. l.c. 93. *Leaves* elliptic-lanceolate, acuminate, somewhat rounded at base; not, or very slightly, decurrent; blade 5 to 8 in. long, by 1.5 to 3.5 in. broad; petiole 2 to 5 in. long not winged. *Inflorescence* more slender, bracts often longer than the peduncle of the corymb. Clarke in Hook. f. Fl. Br. Ind. III. 518; Mez Monog. Myrs. 172. *L. pothoina*, N. E. Brown (*non* Lindl.) in Ill. Hort. XXXII. 95 tab. 561.

PENANG: Hullett 201. PAHANG: Goodenough 2799. SINGAPORE: Lobb 61; Kurz; T. Anderson 196.—DISTRIB. Sumatra, Korthals; Borneo, Motley 1250, Haviland.

VAR. *alata*, Scheff. l.c. 93. *Leaves* thin ashy-green above, dark green below, elliptic oblong, rounded at top or obtusely acuminate; gradually or suddenly narrowed into a broad wing decurrent on the petiole; crenate glands and scales few or none; 6 to 16 in. long, 2 to 4 in. broad. *Inflorescence* with the corymbs usually more closely congested and on a shorter peduncle; flowers somewhat smaller, bracts usually longer than the corymb peduncle, flowers white or pink. Mez Monog. Myrs. 172. *L. alata*, N. E. Brown in Ill. Hort. XXXIII. 123, t. 605.

PERAK: Wray 753B, 824, 2482, 2737; Scortechini; King's Collector



980, 2815, 2882, 2891, 2942, 2974, 2999, 3376, 8325, 10949. SINGAPORE: Lobb 313.—DISTRIB. Sumatra, *Korthals*; Borneo.

2. *LABISIA PAUCIFOLIA*, King & Gamble, n. sp. A small semi-herbaceous undershrub, 10 to 15 in. high; the stems striate, round, minutely purplish-brown-pubescent, bearing rarely more than 3 to 4 leaves. *Leaves* long-petioled, the blade ovate or orbicular-ovate, rounded at top into a bluntly acute point, rounded at base and then very shortly decurrent; entire or very minutely crenate; 2.5 to 4 in. long, 1.5 to 3 in. broad; main-nerves slender, numerous, more or less parallel, joining near the edge; petiole 1 to 2 in. long, thickened at the base and decurrent into the stem. *Inflorescence* 1.5 to 2.5 in. long, consisting of axillary, short-peduncled, rusty-pubescent racemes, the flowers reflexed, single or in few-flowered sessile clusters; pedicels .05 to .1 in. long, with short subulate bracts of equal length. *Calyx-lobes* ovate-acuminate, covered without with numerous glands, .075 in. long; tube short, about half the length of lobes. *Corolla-lobes* oblong-acuminate, .125 in. long, glabrous. *Stamens* closely enfolded; filaments very short; anthers hastate, long apiculate, glandular warted behind, .1 in. long. *Ovary* rounded, pubescent; style about .04 in. long, angular, oblique; stigma minute, notched. *Fruit* a dark red berry, .1 in. in diam., striate and with oblong glands.

PERAK: *Scortechini*; Wray 4102; King's Collector 8078. In open forest at 3,000 to 5,000 feet.

Besides the characteristic leaves, the acuminate petals and hastate long apiculate anthers make this species recognisable, though the leaf-venation resembles that of *L. pumila*.

3. *LABISIA LONGISTYLA*, King & Gamble, n. sp. An undershrub about 2 feet high; stem thick, rusty-brown, minutely pubescent. *Leaves* sessile, oblong, entire, rounded at apex and very slightly emarginate, decurrent below in a broad wing for about  $\frac{1}{2}$  of their length; prominently glandular-pitted above and with rusty glandular scales below; 7 to 12 in. long, 3 to 4 in. broad; midrib very thick, prominent, glandular scaly; main-nerves at right angles to midrib, extremely numerous, straight, parallel, anastomosing towards the edge which is slightly recurved. *Inflorescence* a raceme-like rusty-pubescent panicle of single flowers or shortly peduncled few-flowered secund corymbs, 8 to 9 in. long, the main peduncle about 4 in.; corymb-peduncles curved, angled, .3 to .4 in. long; bracts very short, subulate; pedicels striate, about .15 in. long; bracteoles minute. *Calyx-lobes* ovate, acute, glandular without, tube rather shorter than lobes, together .06 in. long. *Corolla* and *stamens* unknown. *Ovary* rounded, pubescent, crowned by "

filiform .2 in. long style. *Fruit* a globose berry, with a conical top and the remains of the style, glabrous, striate with linear-oblong prominent glands.

PERAK: *Wray* 1590. SELANGOR: *Curtis* 3750, at 3,000 to 4,000 feet.

#### 5. ARDISIA, Swartz.

Small trees, shrubs or semi-herbaceous undershrubs, evergreen, generally all parts with pellucid glands which often dry black. *Leaves* sessile or petiolate, membranous to coriaceous, entire crenate or serrate. *Flowers* regular, pedicellate, hermaphrodite; inflorescence various. *Calyx* inferior, 4-6-lobed, the lobes free or overlapping to the right; tube very open, as long as or shorter than the lobes. *Corolla* red white or spotted, often waxy in appearance, 4-6-lobed, the tube often very short; the lobes overlapping to the right, often twisted. *Stamens* equal in number to, and opposite to, the corolla-lobes, sometimes long and narrow, usually sagittate-lanceolate and apiculate, sometimes very small, fixed to the corolla-tube by filaments usually short and broad; generally opening by slits, occasionally by terminal pores, in *A. littoralis* septate; dehiscence always introrse. *Ovary* globose, sometimes narrowed into the style, more often almost depressed; style usually filiform, rather long; stigma punctiform; ovules few or many, immersed in a globose placenta. *Fruit* a globose, rarely obovoid, berry, usually surmounted by the remains of the style, fleshy, red or purple or black, often spotted; endocarp crustaceous; 1-seeded. *Seed* solitary, large, globose, hollowed at the base; albumen pitted or ruminant; embryo cylindric horizontal.—DISTRIB. 200 to 250 species, all of tropical or sub-tropical regions in both worlds, scarce in Africa.

Leaves entire or crenate, never serrate:—

Leaves entire, or if crenate without glands in the crenatures:—

*Calyx*-lobes not, or only slightly, overlapping to the right, usually small:—

Inflorescence lateral:—

Inflorescence short-peduncled, shorter than the leaves (*I. PIMELANDRA*):—

Leaves entire; inflorescence on wood of current and past years:—

Leaves over 6 in. long; nerves conspicuous:—

Leaves nearly glabrous beneath;  
main-nerves less than 20 ..

1. *A. pachysandra*.

Leaves densely tomentose beneath;  
main-nerves more than 20 ..

2. *A. Teysmanniana*.

- Leaves under 6 in. long :—  
 Leaves shining, nerves obscure ;  
 flower-buds very short, rounded .. 3. *A. chrysophyllifolia*.  
 Leaves not shining, nerves con-  
 spicuous ; flower-buds long, acuminate 4. *A. solanoides*.  
 Leaves crenate ; inflorescence on wood of  
 current year .. 5. *A. fulva*.  
 Inflorescence long-peduncled (II. AKOSMOS):—  
 Peduncles slender, under 1 in. long, pu-  
 bescent ; leaves membranous .. 6. *A. ferruginea*.  
 Peduncles thick, 3 to 3·5 in. long, glabrous ;  
 leaves coriaceous .. 7. *A. lunkawiensis*.  
 Inflorescence terminal :—  
 Style exsert in the bud (III. STYLARDISIA):—  
 Leaves membranous ; inflorescence short,  
 few-flowered, .. 8. *A. andamanica*.  
 Leaves chartaceous or coriaceous, inflor-  
 escence elongate, many-flowered :—  
 Leaves without a conspicuous intra-  
 marginal nerve :—  
 Calyx-lobes ·05 in. long or under,  
 usually glabrous :—  
 Leaves coriaceous :—  
 Leaves not thickly scaly beneath :—  
 Nerves of leaves obscure, leaves  
 dark when dry .. 9. *A. tuberculata*.  
 Nerves of leaves prominent,  
 leaves pale when dry .. 10. *A. ophirensis*.  
 Leaves thickly scaly beneath :—  
 Leaves broad ; main-nerves very  
 many, prominent, over 24 pairs 11. *A. labisiaefolia*.  
 Leaves narrow ; main-nerves  
 fewer, obscure, 20 pairs .. 12. *A. montana*.  
 Leaves chartaceous :—  
 Panicles slender, elongate ; leaves  
 usually small, main-nerves at  
 about 60° to midrib .. 13. *A. sinuata*.  
 Panicles rather thick, compact ;  
 leaves generally large, main-  
 nerves at about 75° to midrib .. 14. *A. colorata*.  
 Calyx-lobes ·2 in. long, ferruginous  
 pubescent .. 15. *A. crassa*.  
 Leaves with a conspicuous intramarginal  
 nerve .. 16. *A. platyclada*.  
 Style not exsert in the bud (IV. ACRAR-  
 DISIA):—  
 Branches of the inflorescence racemose ;  
 buds long, slender .. 17. *A. porosa*.  
 Branches of the inflorescence umbellate ;  
 buds short, conical .. 18. *A. divergens*.  
 Calyx-lobes clearly overlapping to the right,  
 usually large and broad :—  
 Inflorescence terminal (V. TINOPSIS):—

Leaves under 6 in. long; panicle compact,  
pedicels slender, flowers rather small; berry  
globose, .2 in. in diam. .. 19. *A. sumatrana*.

Leaves usually over 6 in. long; panicle  
spreading, pedicels stout, flowers large;  
berry depressed, over .25 in. in diam. .. 20. *A. lanceolata*.

Inflorescence lateral (VI. *Tricus*):—

Anthers septate; leaves coriaceous, obovate,  
inflorescence short .. .. 21. *A. littoralis*.

Anthers not septate:—

Leaves usually over 6 in. long:—

Leaves 8 to 15 in. long, elliptic, buds  
.25 in. long .. .. 22. *A. Kunstleri*.

Leaves 5 to 10 in. long:—

Main-nerves at about an angle of 60°  
with midrib:—

Buds .4 in. long or more; leaves  
coriaceous:—

Buds conical; calyx-lobes  
rounded; raceme glabrous .. 23. *A. solanacea*.

Buds rounded; calyx-lobes emar-  
ginate, raceme rusty-pubescent 24. *A. lurida*.

Buds .3 in. long only, rounded;  
leaves chartaceous .. 25. *A. oxyphylla*.

Main-nerves at only about 30° with  
the midrib; calyx-lobes emarginate 26. *A. Scortechinii*.

Leaves usually under 6 or even 5 in.  
long:—

Leaves few-nerved; inflorescence long,  
racemose .. .. 27. *A. pendula*.

Leaves many-nerved; inflorescence  
short, 1-5-flowered .. .. 28. *A. Hullettii*.

Anthers not known; leaves 7 to 10 in. long,  
under 2.5 in. broad; main-nerves at an angle  
of 80° with midrib in an elegant network  
with secondary nerves and reticulations .. 29. *A. oblongifolia*.

Anthers not known; leaves elliptic or elliptic-  
ovate, acuminate, 4.5 to 6.5 in. long; calyx-  
lobes 4; inflorescence apparently terminal.. 30. *A. tetrasepala*.

Anthers not known; leaves 3 to 5 in. long,  
under 1.5 in. broad, acuminate, flowers 2 .. 31. *A. biflora*.

Anthers not known; leaves 4 to 6 in. long,  
.7 to .9 in. broad, linear-lanceolate; flowers  
in peduncled axillary umbellate racemes,  
about 5 to 8 .. .. 32. *A. tahananica*.

Leaves crenate, with glands in the crenatures

(VII. *CRISPARDISIA*):—

Calyx-lobes more or less gland-dotted:—

Calyx-lobes oblong, obtuse or obtusely acute:—

Calyx-lobes lingulate, over .25 in. long,  
sparsely dotted; inflorescence short; leaves  
lanceolate, more or less villous.. 33. *A. villosa*.

Calyx-lobes under .1 in. long, prominently



dotted; inflorescence long; leaves oblong,  
glabrous, pale .. .. 34. *A. virens*.

Calyx-lobes ovate, more or less acute:—

Inflorescence axillary, racemose or umbel-  
late:—

Racemes or umbels in the axils of upper  
leaves only:—

Leaves over 5 in. long, crenatures broad,  
very shallow, rounded:—

Leaves membranous, pedicels slender 35. *A. Wrayi*.

Leaves coriaceous, pedicels thick .. 36. *A. minor*.

Leaves under 4 in. long, crenatures

narrow, almost dentate .. 37. *A. perakensis*.

Racemes in the axils of all or nearly all

the leaves, crenatures narrow .. 38. *A. Meziana*.

Inflorescence terminal or pseudo-terminal:—

Inflorescence of a single sessile, umbellate

raceme; leaves 4 to 8 in. long .. 39. *A. Ridleyi*.

Inflorescence usually of panicled racemes;

leaves 2 to 4 in. long .. 40. *A. crenata*.

Calyx-lobes not gland-dotted; inflorescence ter-  
minal or pseudo-terminal:—

Branches of inflorescence short, not more than

1 in. long; leaves 2 to 4 in. long .. 41. *A. rosea*.

Branches of inflorescence 2 to 3 in. long;

leaves 4 to 6 in. long .. 42. *A. longepedunculata*.

Leaves acutely and prominently serrate occasionally  
abortive (VIII. *BLADHIA*):—

Inflorescence long, reaching 6 to 8 in.; leaves

large, nearly or quite sessile .. 43. *A. Maingayi*.

Inflorescence short, under 2.5 in.; leaves

petioled:—

Inflorescence 1.5 to 2.5 in. long; anthers

mucronate; leaves under 3 in. long .. 44. *A. theaeifolia*.

Inflorescence under 1.5 in. long; anthers

emarginate; leaves over 4 in. long:—

Leaves and branchlets fulvous-villous;

flowers pink; ovary and base of style

pubescent .. 45. *A. odontophylla* var. *Lobbii*.

Leaves and branchlets glabrous; flowers

white; ovary and base of style glabrous .. 46. *A. bambusetorum*.

1. *ARDISIA PACHYSANDRA*, Mez Monog. Myrs. 97 fig. 14 A-E (1901).

A large shrub or small tree reaching to 40 to 50 feet high, and 6 to 10 in. diam.; branches with pale brown bark, marked with decurrent lines below the leaves or leaf-scars; branchlets thickly rusty-villous at the ends. *Leaves* membranous; oblong or slightly obovate, acute at apex, cuneate at base; glabrous above, except on the midrib which is sometimes minutely pubescent, glabrous or slightly pubescent beneath; entire, glands numerous near the margins; 6 to 10 in. long, 1.5 to 3 in. broad; midrib thick, slightly impressed above; main-nerves

14 to 20 pairs, irregular, .4 to .5 in. apart, starting at an angle of about 60°, then slightly arching to and along the margin; petiole .4 to .6 in. long, pubescent, wrinkled, slightly channelled above. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels or corymbs; peduncles .1 in. long, flowers 6 to 8; pedicels slender, pubescent, striate, .4 in. long; bracts minute, subulate, densely pubescent, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .2 in. long, slightly overlapping to the right, ciliate, gland-dotted especially near the tip. *Corolla-lobes* boat-shaped, broadly ovate, shortly acuminate, .3 in. long, glabrous, white, faintly nerved, dots very few, revolute in flower; tube short. *Stamens* a little shorter than corolla-lobes; anthers ovate, cuspidate-acuminate, much gland-dotted and warted at the back on the connective; filaments thick. *Ovary* rounded, glabrous, style subulate, as long as the anthers. *Berry* .2 to .4 in. in diam., globose, glabrous, pale. *Myrsine pachysandra*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 297; Wall. Cat. 2284; A. DC. in Trans. Linn. Soc. XVII. 111. *Pimelandra Wallichii*, A. DC. in Ann. Sc. Nat. 2. XVI. 88; Prod. VIII. 106; Deless. Ic. Sel. V. 14. t. 31; Scheff. Myrs. 94; Miq. Fl. Ind. Bat. II. 1029; Clarke in Hook. f. Fl. Br. Ind. III. 531.

PENANG: *Wallich* 2284; *Porter*; *Curtis* 1156, 3164, 3181, 3737. MALACCA: *Griffith* (K.D.) 3597; *Maingay* (K.D.) 1006. PERAK: *Wray* 1358; *King's Collector* 5995, 7194.—DISTRIB. Borneo (?).

2. *ARDISIA TEYSMANNIANA*, Scheff. in Tijdschr. Ned. Ind. XXXI. 368 and in Flora 253 (1870). A large shrub or small tree; branchlets brown, with wavy longitudinal lines passing downwards from the sides of the bases of the petioles, lenticels numerous, innovations densely ferruginous-pubescent. *Leaves* entire, chartaceous; oblong or slightly obovate-oblong or oblong-lanceolate, acuminate at the apex, alternate and sometimes abruptly rounded at base; glabrous above, densely ferruginous-tomentose beneath; glands very numerous, small, evenly distributed over the whole under surface; 6 to 11 in. long, 1.5 to 3 in. broad; midrib thick, prominent beneath; main-nerves 25 to 30 pairs, .3 to .4 in. apart, starting at an angle of 60°, at first straight, then curving to meet in the margin in a looped nerve, raised beneath as are the few secondary nerves and the many oblique reticulations; petiole very thick, .5 to .6 in. long, usually bordered by the decurrent margins of the blade which are again revolute. *Inflorescence* of axillary pedunculate umbels or corymbs; peduncles in flower .1 to .2 in. long, in fruit sometimes up to .5 in., 4-5-flowered; pedicels slender, .4 in. long, densely rusty-pubescent, striate; bracteoles linear-subulate, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .1 in. long, ciliate. *Corolla-lobes* ovate-acuminate, .2 in. long, softly

pubescent, glands inconspicuous, tube very short. *Stamens* nearly as long as corolla-lobes; anthers ovate, cuspidate-acuminate, concave and warted on the connective at the back, .175 in. long; filaments slender, .05 in. long, glabrous. *Ovary* rounded, glabrous; style slender, subulate, as long as stamens. *Berry* globose, slightly depressed, .3 in. in diam., black-gland-dotted, faintly ribbed. Mez in Monog. Myrs. 97. *Pimelandra Teysmanniana*, Hook. f. in Benth. & Hook. f. Gen. Pl. II. 64. *Pimelandra Wallichii* var. *Teysmanniana*, Clarke in Hook. f. Fl. Br. Ind. III. 531.

MALACCA: *Maingay* (K.D.) 1007. SINGAPORE: *Cantley*; *Ridley* 2800, 5573, 6788.—DISTRIB. Bangka.

This species is easily distinguished from the former by having many more and much closer nerves to the leaves, and by the dense rusty tomentum.

3. *ARDISIA CHRYSOPHYLLIFOLIA*, King & Gamble, n. sp. A tree, branchlets reddish-brown, innovations densely ferruginous-pubescent. *Leaves* entire, coriaceous; oblong-lanceolate, obtusely acute at apex, narrowed at base; glabrous on both surfaces; glands scattered, visible on the under surface; 4 to 6 in. long, .75 to 1.25 in. broad; midrib thick, prominent; main-nerves many, more or less parallel, inconspicuous, meeting, with the secondary nerves, in a wavy intramarginal nerve, reticulations fine; petiole .4 to .5 in. long, glabrous, channelled above and edged by the decurrent margin of the blade. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels of up to about 12 flowers; pedicels slender, .2 in. long, ferruginous-pubescent; bracts minute, triangular; buds very short, rounded. *Calyx-lobes* 5, ovate, minutely ciliate, pubescent and scaly outside, dotted with many conspicuous golden glands, .05 in. long, tube a little shorter. *Corolla-lobes* ovate, concave, sparsely glandular, glabrous, .08 in. long; tube none or very short. *Stamens* a little shorter than the corolla-lobes; anthers ovate acuminate, black-gland-dotted behind; filaments short. *Ovary* rounded, glabrous; style subulate, .05 in. long. *Berry* globose, somewhat depressed, covered with round and elongate glands, .15 in. in diam.

PERAK: at Lower Camp, Gunong Patch, 3,400 feet, *Wray* 483, 1118, 1182.

4. *ARDISIA SOLANOIDES*, King & Gamble, n. sp. A small shrub, 3 to 4 feet high; branches slender, smooth, dark brown; branchlets glandular-hirsute, marked by obscure raised lines from the sides of the bases of the petioles. *Leaves* entire, membranous; elliptic, bluntly long caudate-acuminate at apex, attenuate at base; glabrous above, more or less glandular-hirsute beneath; glandular dots many, scattered, prominent; 2.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib slender,

raised beneath ; main-nerves 8 to 9 pairs, raised, at an angle of  $60^{\circ}$  with the midrib, the lowest pair more oblique, nearly straight, meeting at about two-thirds of the way to the margin in a looped intramarginal raised nerve, reticulations obscure ; petiole .15 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of sessile, axillary, umbellate, nearly glabrous racemes of about 4 to 6 flowers, racemes hardly .1 in. long ; bracteoles oblong-lanceolate, gland-dotted, .1 in. long ; pedicels slender, .3 to .4 in. long, slightly clavate ; buds conical, acuminate, .3 in. long ; flowers white with a blueish tinge. *Calyx-lobes* 4 to 5, very short, rounded, scarious and ciliate on the margins, gland-dotted. *Corolla-lobes* ovate below, caudate-acuminate above, twisted and reflexed in flower, .3 in. long, sparsely pale-glandular-punctate. *Stamens* nearly as long as corolla-lobes, lanceolate, membranous at tip, with two lines of glandular dots on the back of the connective. *Ovary* rounded ; style very slender, as long as stamens. *Berry* bright red, glossy, .25 in. in diam. when dry.

PERAK : in dense jungle on rich soil, at 500 to 800 feet, *King's Collector* 4254.

This species very closely resembles *Antistrophe caudata*, but is at once distinguished by the fact of the corolla-lobes overlapping to the right instead of to the left. The flowers somewhat resemble those of *Ardisia porosa*.

5. *ARDISIA FULVA*, King & Gamble, n. sp. Apparently a shrub ; branchlets rather thick, usually marked by raised lines descending from the bases of the leaves ; innovations densely tawny-villous ; leaf-buds lanceolate, densely pubescent. *Leaves* coriaceous ; elliptic-oblong or elliptic-lanceolate, shortly acuminate at apex, somewhat rounded at base ; glabrous or slightly scaly above, thickly tawny-villous beneath ; glandular dots few, scattered, obscure, in the areoles of the minor nerves ; crenate, especially in the upper two-thirds ; 4 to 7 in. long, 1 to 2 in. broad ; midrib slender ; main-nerves 20 to 24 pairs, irregular, arching upwards and joining in an intramarginal nerve ; secondary nerves slender, faint, reticulations curved ; petiole .4 to .6 in. long, winged by the decurrent edges of the blade. *Inflorescence* of short 1 to 1.5 in. long, densely tawny-pubescent, drooping, corymbs in the axils of tawny, leaf-like, often nearly 1 in. long, bracts from the young branches below the end leaves ; peduncles about .7 in. long, slender, pedicels slender, up to .5 in. long ; bracteoles subulate, short, tawny ; buds ovate, .2 to .25 in. long. *Calyx-lobes* ovate, thin, villous without, ciliate, .1 to .15 in. long, marked with prominent black dots, recurved in flower ; tube short. *Corolla-lobes* obovate, obtuse, .2 to .25 in. long, oblique, unequal, marked by prominent round or oblong black dots, tube short. *Stamens*



a little shorter than the corolla-lobes, acuminate, with 2 rows of prominent black dots behind the anthers; filaments short. *Ovary* ovoid, surmounted by a short, .1 in. long, subulate style, glabrous. *Berry* .2 in. in diam., black when dry, ribbed.

KEDAH: on Langkawi Island, *Curtis* 2133. PENANG: *Ridley* 10216. PERAK: *Ridley* 8269.

6. *ARDISIA FERRUGINEA*, Mez Monog. Myrs. 108 (1901). A shrub (?); branchlets slender, densely ferruginous-tomentose. *Leaves* membranous; linear- or oblong-lanceolate, bluntly acute at apex, rounded at base; glabrous or slightly rusty-scaly above, rusty-pubescent beneath; entire; glands not apparent; 3 to 4.5 in. long, .75 to 1 in. broad; midrib slender, nerves very faint; petiole .1 to .2 in. long, rusty-pubescent. *Stipules* small, linear-falcate. *Flowers* in densely ferruginous-pubescent, bipinnate panicles in the axils of upper leaves; peduncles .5 to .75 in. long; bracts linear subulate about .15 in.; pedicels slender, .1 to .2 in. long; bracteoles minute; buds conical. *Calyx-lobes* ovate, obtuse, ciliate, connate to rather over one-third, with wavy glandular dots. *Corolla-lobes* shortly connate at the base, broadly and obliquely ovate, short acuminate, gland-dotted. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate, gradually acute, scarcely punctate; filaments very short. *Ovary* ovoid, glabrous, style slender.

JOHORE: at Kampong Sunpai, *Lake & Kelsall* (*Ridley* 4032).

This species does not seem to differ very much from *A. Miqueliana*, Scheff. in *Tijdsch. Ned. Ind.* XXXI. 367, in respect to leaves, but that species has terminal and not axillary flowers.

7. *ARDISIA LANKAWIENSIS*, King & Gamble, n. sp. A tree; branchlets smooth, glabrous, obscurely striate, with raised lines from the edges of the bases of the leaf-petioles. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acuminate at apex, acute at base, glabrous; entire; glandular dots frequent near the margins; 3.5 to 5 in. long, 1.25 to 1.5 in. broad; midrib slender; main-nerves obscure, about 12 to 14 pairs, anastomosing near the margin, secondary nerves and reticulations similar; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade. *Flowers* pink, in long-peduncled, closely congested racemes in the axils of the uppermost leaves; peduncles 3 to 3.5 in. long, flattened, glabrous; pedicels .5 to .7 in. long, striate, slender; bracteoles minute, caducous. *Calyx-lobes* ovate, acute, ciliate, with many glands on the back, .075 in. long. *Corolla-lobes* ovate, acuminate, much gland-dotted, .25 to .3 in. long. *Stamens* a little shorter than the corolla-lobes, ovate-lanceolate, mucronate, dehiscing on the margins but more widely near the top. *Ovary* rounded, obscurely 5-lobed; style .2 in. long, twisted and

wrinkled. *Fruit* a depressed, obscurely 5-angled berry, .2 in. in diam., pericarp very smooth inside.

KEDAH: on Lankawi Island, *Ridley* 8313.

8. *ARDISIA ANDAMANICA*, Kurz For. Fl. II. 108 (1877) and in Journ. As. Soc. Beng. XLVI. ii. 225. A small or medium-sized evergreen shrub reaching 15 feet high and 2 in. in diam.; branches slender with reddish-brown bark, striate when dry, branchlets glabrous. *Leaves* entire, membranous; oblong lanceolate, narrowly long acuminate at apex, cuneate at base; glabrous on both surfaces but with many scattered glandular dots and occasional peltate scales; 3 to 6 in. long, .75 to 1.75 in. broad; midrib slender; main-nerves about 20 pairs, very thin and inconspicuous, at about 60° with the midrib, at first straight then arching upwards to and along the margin; petiole .3 to .5 in. long, channelled above. *Inflorescence* a loose terminal panicle 2 to 3 in. long, with few slender umbel-like racemes on .3 to .5 in. long, squarrose peduncles; pedicels slender, .3 in.; bracteoles small, ovate, deciduous. *Calyx-lobes* acute, triangular, .05 in. long, minutely ciliate at the edges, dotted with black glands; tube rather shorter than lobes. *Corolla-lobes* ovate, acute, .15 in. long, glabrous, with inconspicuous nerves and few scattered round or oblong glands. *Stamens* a little shorter than corolla-lobes; anthers ovate, apiculate, .1 in. long, glabrous on the back or with few black glands; filaments .05 in. *Ovary* rounded, glabrous; style filiform, long exsert, .15 in. long. *Berry* round or slightly pyriform, smooth, .3 in. in diam. Clarke in Hook. f. Fl. Br. Ind. III. 521; Mez Monog. Myrs. 110. *Ardisia neriifolia*, A. DC. Prod. VIII. 127 in part (not of Wall.), Trans. Linn. Soc. XVII. t. 8 (fig. only).

MALACCA: *Griffith* (K.D.) 3570; *Hullett* 830; *Stoliczka*. PERAK: *Ridley* 9718; *Wray* 867, 943, 971, 1033; *King's Collector* 5692, 8064. JOHORE: *Ridley* 3717.—DISTRIB. Andamans, Mergui.

9. *ARDISIA TUBERCULATA*, Wall. Cat. 2274 (1829). A shrub, reaching 10 feet in height; branchlets smooth, stout, reddish, uppermost flattened, glabrous. *Leaves* entire, coriaceous; elliptic, bluntly acuminate at apex, attenuate or rounded at the base; glabrous and shining above, covered beneath with rather deciduous peltate scales, dark when dry; 3 to 6 in. long, 1 to 2 in. broad; midrib prominent; main-nerves obscure, about 15 pairs, starting at an angle of about 75° from the midrib, then arched upwards to and along the margin; secondary nerves more slender, reticulations obscure; petiole .3 to .5 in. long, thick, rough, winged by the decurrent margins of the blade. *Inflorescence* a lax, leafy, terminal, tripinnate, 3 to 6 in. long, panicle; rachis flexuous, flattened, often scaly; primary peduncles squarrose, .6 to 1 in. long, supported by ovate acuminate leafy bracts; secondary peduncles also squarrose,

·3 to ·5 in. long with subulate bracts; ultimate racemes umbellate, 6-8-flowered; pedicels slender, short, ·1 to ·15 in. long; bracteoles subulate; buds ovoid, obtuse, glabrous. *Calyx-lobes* ovate, acute or rounded, ·05 in. long; margin ciliate, dotted with black glands. *Corolla-lobes* broadly ovate, blunt, glabrous, ·1 in. long, with very few dots; tube very short. *Stamens* a little shorter than the corolla-lobes; anthers acute, but gland-dotted behind; filaments minute, broad. *Ovary* globose; style subulate, longer than the petals. *Berry* obovoid, smooth, ·15 to ·2 in. in diam. A. DC. in Trans. Linn. Soc. XVII. 119, Prod. VIII. 130; Miq. Fl. Ind. Bat. II. 1026; Clarke in Hook. f. Fl. Br. Ind. III. 521, *except var.*; Mez Monog. Myrs. 112, fig. 16. *A. chrysophylloides*, Miq. Fl. Ind. Bat. Suppl. 574.

PENANG: Wallich 2274. MALACCA: Derry 394. PAHANG: Ridley 1071. JOHORE: Ridley 6438. SINGAPORE: Griffith (K.D.) 3564; Maingay (K.D.) 1014; Ridley 2817, 8916, 1916(A).—DISTRIB. Bangka Teysmann.

10. *ARDISIA OPHIRENSIS*, Mez Monog. Myrs. 113 (1901). A shrub(?); branchlets pale brown, flattened, smooth; innovations minutely ferruginous-scaly. *Leaves* coriaceous; elliptic, shortly acuminate at apex, rounded or somewhat acute at base; pale and somewhat shining on both surfaces, the under covered with minute brown peltate scales; glands scattered, numerous; 3 to 6 in. long, 1·75 to 2·25 in. broad; midrib thick, prominent; main-nerves prominent, raised on both surfaces, 10 to 12 pairs, starting at an angle of about 75° with the midrib, at first straight then curving upwards to meet some way from the margin in a prominent network; secondary nerves prominent, reticulations transverse; petiole ·4 to ·5 in. long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a terminal, leafy, angular, tripinnate panicle, about 3 to 4 in. long; rachis flexuous, flattened, scaly; peduncles squarrose, about 1 in. long, supported by ovate-oblong, reflexed, leafy bracts; pedicels ·3 in. long, slender, in fruit very spreading. *Calyx-lobes* ovate, acute, ·05 in. long, back dotted with prominent large glands. *Corolla-lobes* elliptic-ovate, rather oblique, shortly connate, nervose; glands few, near the apex, black. *Stamens* rather shorter than the corolla-lobes; anthers ovate, large, not glandular, apiculate; filaments short, slender. *Ovary* ovoid, glabrous; style long, subulate, exsert. *Berry* black when dry, ·15 in. in diam., with prominent glands. *A. tuberculata* var. *ophirensis*, Clarke in Hook. f. Fl. Br. Ind. III. 522.

MALACCA: Hullett 754; Ridley 621; Miller 9. On the top of Mount Ophir.

11. *ARDISIA LABISIAEFOLIA*, King & Gamble, n. sp. A small tree; branchlets thick, slightly flattened, smooth, glabrous below, lepidote-

scaly above. *Leaves* coriaceous; elliptic or elliptic-oblong, shortly and rather abruptly acuminate at apex, rounded at base; glabrous above when old, when young densely covered, as is the under-surface always, with rather large reddish-brown peltate scales, margins recurved; 6 to 8 in. long, 2 to 4 in. broad; midrib thick, prominent, impressed above; main-nerves 24 to 30 pairs, irregularly spaced, at first parallel, leaving the midrib nearly at right angles, then near the margin curving upwards to and along the margin and anastomosing with the prominent secondary nerves which resemble the main ones; reticulations prominent in an elegant network, all more or less raised above when dry; petiole .5 to .8 in. long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a pyramidal, rusty-scaly, bracteate, tripinnate panicle, up to 6 in. long, the branches bearing sub-umbellate, pedunculate clusters of small flowers; rachis somewhat flattened, rusty-scaly; bracts leafy spatulate; bracteoles minute, ovate; pedicels .1 to .2 in. long, reflexed. *Calyx-lobes* ovate, .06 in. long, ciliate, scaly and glandular-dotted; tube one-third of lobes. *Corolla-lobes* deep pink, ovate-acute, .14 in. long, with a very few black glands. *Stamens* nearly as long as corolla-lobes; anthers ovate, acute, .1 in. long, apiculate; filaments rather thick, .3 to .4 in. long, minutely pubescent. *Ovary* rounded, glabrous; style slender, exsert. *Berry* globose, often depressed at top, .15 to .2 in. in diam., black when dry.

PERAK: *Wray* 320, 1566; *Scortechini*. Hilltops at 6,500 to 7,000 feet.

12. *ARDISIA MONTANA*, King & Gamble, n. sp. A shrub reaching 4 to 6 feet in height; branchlets brown, somewhat angular, uppermost covered with a nearly furfuraceous glandular tomentum. *Leaves* coriaceous; elliptic-oblong or oblong-lanceolate, obtusely acuminate at apex, rounded or attenuate at base; scaly above, densely ferruginous-hairy and scaly beneath, scales stellate; glandular dots scattered, obscure; margins slightly recurved; 4 to 6 in. long, 1 to 2 in. broad; midrib prominent, impressed above; main-nerves 20 pairs, obscure, irregular, starting nearly at right angles to the midrib and curving upwards to and along the margin; secondary nerves many, reticulations obscure; petiole .5 in. long, channelled above by the decurrent margins of the blade, densely scaly and ferruginous-pubescent. *Inflorescence* a rather lax, terminal, pyramidal, bi-tri-pinnate, leafy panicle, up to 6 in. long in fruit, shorter in flower, the branches bearing sub-umbellate pedunculate clusters of minute flowers; rachis somewhat flattened, furfuraceous-scaly; branches squarrose; peduncles .5 to .7 in. long; umbel-peduncles .5 in. long; pedicels .2 in. long, often reflexed; bracts leafy, deciduous; bracteoles ovate, very small. *Calyx-lobes* ovate-acute, under .05 in. long, margins scarious ciliate, dotted with large glands.



*Corolla-lobes* slightly longer than calyx-lobes, ovate, glabrous, gland-dotted. *Stamens* as long as corolla-lobes; anthers ovate, apiculate; filaments extremely short. *Ovary* rounded, glabrous; style subulate, rather thick, scarcely exsert. *Berry* red, globose, .15 in. in diam., gland-dotted when dry.

PERAK: Wray 327, 3869; Scortechini 296; King's Collector 8029. Rocks and hilltops at 3,000 to 7,000 feet.

13. *ARDISIA SINUATA*, King & Gamble, n. sp. A shrub or small tree, reaching a height of 10 to 15 feet and a diam. of stem of 2 to 3 in.; branchlets pale brown, sinuate, compressed, with raised lines joining the sides of the bases of the petioles, minutely scaly-pubescent or nearly glabrous. *Leaves* chartaceous; elliptic-oblong, acute or shortly acuminate at apex, rounded or attenuate at base; glabrous above, minutely scaly beneath when young, afterwards glabrate; glandular dots few, scattered; 3 to 6 in. long, 1 to 2 in. broad; midrib slender; main-nerves 10 to 12 pairs, .3 to .4 in. apart, starting from the midrib at an angle of 60° and at once curving upwards to and along the margin; secondary nerves and reticulations faint; petiole .3 to .4 in. long, channelled above by the decurrent margins of the blade. *Inflorescence* a lax, terminal, bracteate, nearly glabrous, bi-tri-pinnate panicle 5 to 7 in. long, the branches bearing subumbellate clusters of small flowers; rachis flat, sinuate; bracts leafy, uppermost lanceolate recurved, .5 to 1 in. long; bracteoles minute, ovate; pedicels slender, .1 in. long. *Calyx-lobes* triangular-ovate, glabrous, ciliate, gland-dotted, .04 in. long. *Corolla-lobes* pale green or pink, ovate, acute; margins transparent. *Stamens* nearly as long as corolla-lobes; anthers broadly ovate, shortly apiculate; filaments very short. *Ovary* rounded, glabrous; style slender, exsert, .1 to .15 in. long. *Berry* globose, .15 in. in diam., obscurely striate and black when dry.

PERAK: Wray 2408, 3023; King's Collector 4599.

14. *ARDISIA COLORATA*, Roxb. Hort. Beng. 16 (1814), Fl. Ind. I. 581, and Fl. Ind. Ed. Carey and Wall. II. 271. A large shrub or small tree, reaching 25 feet in height and a girth of 1 foot; branchlets compressed, pale brown, more or less lepidote-scaly, furnished with somewhat zigzag raised lines proceeding downwards from the sides of the bases of the petioles. *Leaves* chartaceous; oblong-lanceolate or elliptic-lanceolate, acute or shortly acuminate at apex, cuneate at base; glabrous on both surfaces, entire; glandular dots many, irregularly scattered, chiefly visible on the upper surface; 5 to 10 in. long, 1.5 to 3 in. broad; midrib prominent beneath, impressed above; main-nerves 20 to 30, also prominently raised beneath and impressed above, usually .3 to .4 in. apart, starting at an angle of 70° to 75° with the midrib, at first straight

then arched upwards to and along the margin; secondary nerves many, slender, 1 to 2 between each pair of main-nerves, reticulations oblique; petiole rather thick, .5 to .8 in. long, channelled above, winged by the decurrent margins of the blade. *Inflorescence* a pyramidal terminal panicle, 4 to 12 in. long, tripinnate, ferruginous scaly, bearing clustered umbellate racemes of flowers; rachis much flattened, as are its branch peduncles; primary branches 2 to 6 in. long, peduncle .5 in., bracts caducous; secondary branches .5 to 1 in. long, peduncles .2 to .4 in., bracteoles small, ovate-acuminate; pedicels slender. .1 to .2 in. long; umbels many-flowered. *Calyx-lobes* ovate, bluntly acute, .05 to .08 in. long, densely gland-dotted, margins scarious and ciliate; tube rather shorter than lobes. *Corolla-lobes* pink, ovate-acute, oblique, unequal, about .15 in. long, not gland-dotted; tube very short. *Stamens* a little shorter than corolla-lobes; anthers sagittate, acuminate; filaments very short. *Ovary* ovoid, glabrous; style thick, .2 in. long. *Berry* globose, .2 to .25 in. in diam., deep red to black, obscurely ribbed when dry, shining. Clarke in Hook. f. Fl. Br. Ind. III. 520; Mez Monog. Myrs. 113. *A. pyramidalis*, Roth Nov. Pl. Sp. 123 (not of Cav.). *A. Rothii*, A. DC. in Trans. Linn. Soc. XVII. 117, Prod. VIII. 126. *A. anceps*, Wall. in Roxb. Fl. Ind. l.c. 280, and Cat. 2261; DC. Prod. l.c.; Kurz in Journ. As. Soc. Beng. XLVI. II. 224, and For. Fl. II. 107; Scheff. Myrs. 77. *A. polycarpa*, Wall. Cat. 2285. *A. grandiflora*, Wall. Cat. 2272.

KEDAH: *Ridley* 5509. PERAK: *Scortechini* 20, 203, 397, 1505, 1568; *King's Collector* 798, 1301, 3099, 3284, 3567, 6473, 6823, 7741, 8252, 10866; *Ridley* 5508. PROVINCE WELLESLEY: *Ridley* 6945. SELANGOR: *Ridley* 7559; *Goodenough* 10551. MALACCA: *Maingay* (K.D.) 1008; *Goodenough* 1762; *Derry* 553, 915, 1075; *Ridley* 1245, 1581, 2817.—DISTRIB. India, Burma, Malay Islands.

VAR. *polyneura*, Clarke in Hook. f. Fl. Br. Ind. III. 520. *Leaves* paler when dry than in the typical form; wide, reaching 4.5 in. in width, sometimes reaching 15 in. in length; more usually elliptic, oblong or obovate, more rounded at base; all nerves more prominent. *Panicle* wide at the base; pedicels much reflexed; rachis very much flattened. *A. polyneura*, Miq. in Pl. Jungh. I. 198, and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 81.

PERAK: *Ridley* 3000; *Scortechini* 1290, 1412; *Wray* 1643, 1950, 2810; *King's Collector* 527, 2152, 2197, 2629, 3643, 3655, 3657, 4119, 4751, 6922, 8640. MALACCA: *Griffith* (K.D.) 3568.—DISTRIB. Java.

VAR. *complanata*, Clarke l.c. *Panicles* smaller, rusty-pubescent; flowers and berries smaller; panicle, rachis, and branches much flattened. *Leaves* usually narrower and smaller, rarely over 7 in. long

and 2.75 in. broad. *A. complanata*, Wall. Cat. 2277; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 210; DC. Prod. VIII. 126; Scheff. Myrs. 78; Miq. Fl. Ind. Bat. II. 1024. *A. sanguinolenta*, Bl. Bijdr. 685 (not of Wall.). *A. Zollingeri*, DC. Prod. VIII. 670.

PENANG: Wallich 2277; Curtis 1052, 22494. PERAK: Wray 2896, 3929; Scortechini 144, 112; King's Collector 7680.—DISTRIB. Chittagong, Java, Sumatra.

VAR. *salicifolia*, King & Gamble. Leaves lanceolate, 5 to 7 in. long, 1 to 1.5 in. broad, glabrous, obscurely gland-dotted; main-nerves not prominent. Panicles spreading, leafy; rachis zigzag, much flattened; bracteoles persistent.

PERAK: Wray 2960; King's Collector 3216, 6816, 8563. MALACCA: Hervey.

VAR. *elliptica*, King & Gamble. Leaves elliptic or elliptic-obovate, acuminate at apex, cuneate at base, glabrous; 4.5 to 8 in. long, 2 to 3 in. broad; main-nerves fewer, 15 to 20 pairs, less prominent. Panicles rather short and stout, 4 to 6 in. long, pyramidal, rachis less flattened, scarcely zigzag.

PERAK: Wray 3293; King's Collector 3326, 3453, 5057, 6473, 6624, 6820, 8856.

15. *ARDISIA CRASSA*, Clarke in Hook. f. Fl. Br. Ind. III. 518 (1882). A small tree; branches pale brown, rounded, stout; branchlets somewhat flattened above and with raised lines from below the base of the petioles. Leaves coriaceous; oblong, acute or slightly blunt-acuminate above, cuneate at base; glabrous and shining above, rufescent and with inconspicuous rounded scales beneath; entire; 4 to 9 in. long, 1.5 to 2.5 in. broad; midrib prominent beneath; main-nerves nearly regular at first, nearly at right angles to midrib, afterwards arching upwards and round parallel to the edge, 20 to 27 pairs, secondary obscure. Inflorescence a terminal rusty-pubescent panicle, 5 to 6 in. long, with remote branches ending in closely packed umbels; rachis thick, much flattened, flexuose; branches first at right angles, then curved, .5 to .8 in. long; pedicels very short, thick; bracteoles ovate, blunt, about .1 in. long. Calyx-lobes thick, ovate-orbicular, .2 in. long, minutely ferruginous-pubescent, overlapping to right; tube about half the length of the lobes. Corolla-lobes broadly ovate, unequal, obliquely and shortly acute, .15 in. long. Stamens shorter than corolla-lobes; anthers ovate, acute; filaments very short, broad at base. Ovary rounded, glabrous; style short, about .1 in. long, subulate. Berry globose, depressed, not striate, .25 in. in diam. Mez Monog. Myrs. 114.

MALACCA: Maingay (K.D.) 1015; Goodenough 1808.—DISTRIB. Borneo.

16. *ARDISIA PLATYCLADA*, King & Gamble, n. sp. A small tree or shrub reaching 10 to 15 feet in height; branchlets pale brown, prominently marked by zigzag raised lines joining the sides of the bases of the petioles; uppermost ones prominently flattened and covered with rusty furfuraceous scales, as are also the young leaves. *Leaves* chartaceous; oblong or elliptic-oblong, abruptly acuminate at apex, attenuate and somewhat rounded at base; both surfaces covered when young with rusty stellate scales, glabrescent when old; margins undulate, recurved; 4 to 6 in. long, 1.5 to 2 in. broad; midrib slender but prominent beneath, impressed above; main-nerves 14 to 18 pairs, .3 to .4 in. apart, rather irregularly parallel, leaving the midrib at an angle of about 65° and joining at .1 to .2 in. from the margin in a very prominent intramarginal looped nerve; secondary nerves and reticulations obscure; petiole none or very short, rarely .2 in. long, rugose, rusty-scaly, and bordered by the decurrent margins of the blade. *Inflorescence* a terminal, compact, bracteate, rusty-scaly, pyramidal, bi-tri-pinnate panicle, 4 to 5 in. long, the flowers in dense subumbellate clusters on the branches; rachis flattened, flexuose; bracts foliaceous, spatulate or oblong-lanceolate, .5 to 1.5 in. long; bracteoles small, triangular-subulate; pedicels glabrous, cernuous, about .1 in. long; buds very small, conical. *Calyx-lobes* pink, lanceolate, .04 in. long, ciliate, obscurely red-gland-dotted; tube as long as or rather shorter than the lobes. *Corolla-lobes* waxy-white, ovate-acuminate, .07 in. long, slightly gland-dotted; tube very short. *Stamens* shorter than corolla-lobes; anthers ovate, apiculate; filaments very short. *Ovary* rounded, minutely pubescent at top; style straight, .15 in. long, exsert. *Berry* globose, .15 to .2 in. in diam., glandular-rugose, dark blue, black when dry.

PERAK: *Scortechini* 232; *King's Collector* 824, 4569, 5863, 8136, 10140; usually in dense mixed forest.

*A. pterocaulis*, Miq.; Mez Monog. Myrs. 111, a tree of the forests of the Sumatran mountains, much resembles this at first sight, but the leaves are bigger, the flower panicles much larger and more open, with shorter pedicels, and the nerves of the leaves do not meet in a prominent looped intramarginal nerve. (*Forbes* 1992 in Herb. Calc.)

17. *ARDISIA POROSA*, Clarke in Hook. f. Fl. Br. Ind. III. 522 (1882). A shrub, reaching 8 feet in height; branches flexuose, almost zigzag, winged by lines decurrent from the bases of the leaf-petioles. *Leaves* chartaceous; oblong, acute at apex, cuneate at base or sometimes rounded-acute; glabrous, pale beneath; entire, margin often recurved; glands small and obscure; 5 to 9 in. long, 1.5 to 2.5 in. broad; midrib rather slender, prominent beneath; main-nerves obscure, irregular, about



20 to 25 pairs; secondary faint, all arching upwards into an irregular intramarginal ring and reticulate; petiole .4 in. long, narrowly winged by the decurrent blade. *Inflorescence* a loose terminal few-flowered panicle up to 6 in. long; rachis flexuous; branches racemose, at right angles to rachis; peduncles 1 to 1.5 in. long, curving upwards; pedicels .5 to .7 in. long, slender, curved upwards; bracteoles minute, ovate, deciduous; flowers 3-5-, usually 4-merous; buds slender. *Calyx-lobes* ovate, .04 in. long, obscurely dotted; tube short. *Corolla-lobes* ovate-lanceolate, pink, .3 in. long by .1 in. broad, recurved in flower, not dotted but striate. *Stamens* as long as corolla-lobes; anthers very slender, opening by terminal pores as well as longitudinally; filaments very short, thick. *Ovary* conical, gradually passing into a slender style .25 in. long. *Berry* globose, .25 in. in diam., ribbed, glossy black when ripe. Koord. & Val. Bijdr. V. 260; Mez Monog. Myrs. 118.

PERAK: *Scortechini* 116, 1511; *King's Collector* 3108. MALACCA: *Griffith* (K.D.) 3578; *Maingay* (K.D.) 1012; *Wray* 39; *Goodenough* 1528; *Hervey*.

18. *ARDISIA DIVERGENS*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, and Fl. Ind. ed. Carey & Wall. II. 275. A small tree, reaching 20 feet in height; branchlets slender, smooth, rounded. *Leaves* chartaceous; elliptic or lanceolate, shortly acuminate at apex, rounded at base, drying reddish-brown; glabrous on both surfaces; entire, margins slightly incurved; glandular dots large, prominent, especially near the margin; 3 to 5 in. long, 1 to 2 in. broad; midrib prominent beneath; primary nerves 8 to 12 pairs, irregular, arched and joining in an intramarginal prominent nerve with a smaller, less prominent nerve near the edge; secondary nerves few, slender, reticulate; petiole .15 to .3 in. long, winged by the decurrent blade. *Inflorescence* a loose terminal rusty-pubescent panicle, 2 to 3 in. long, ultimate branches umbelled, 3-5-flowered; main peduncle .5 to 1 in. long, secondary peduncles about .5 in. with lanceolate leafy recurved bracts; pedicels about .4 in. long, thickened above, glandular; bracteoles ovate, deciduous; flowers red, buds short, conical. *Calyx-lobes* rounded, .05 in. in diam., ciliate, conspicuously dotted with few large, transparent, light brown glands; tube short. *Corolla-lobes* ovate, acute, .15 to .2 in. long, unequal in size, and oblique; tube very short, dots very few. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate-acute; filaments very short. *Ovary* ovoid, glabrous, attenuated into a .1 in. long style. *Berry* round, smooth, somewhat depressed, tipped by the persistent style. Wall. Cat. 2269; A. DC. Prod. VIII. 130; Clarke in Hook. f. Fl. Br. Ind. III. 521; Mez Monog. Myrs. 117. *A. punctata*, Jack;

Roxb. Fl. Ind. ed. Carey & Wall. II. 275 (not of Lindl.). *A. punctulosa*, D. Dietr. Syn. Pl. I. 615; Miq. Fl. Ind. Bat. II. 1025.

PENANG: *Jack*; *Wallich* 2269; *Maingay* (K.D.) 1020; *Curtis* 1769.

19. *ARDISIA SUMATRANA*, Miq. Pl. Jungh. I. 195 (1853), Fl. Ind. Bat. II. 1018, and Suppl. 247. A large shrub or small tree, reaching 15 to 20 feet in height and 3 to 4 in. in diam. of stem; branches pale brown, smooth; branchlets minutely ferruginous-scaly. *Leaves* chartaceous; elliptic-oblong or -obovate, rather suddenly acute at apex, acute or cuneate at base; entire, glabrous; glands large, frequent near the margin; 3 to 6 in. long, 1.5 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 12 to 15 pairs, irregularly spaced, starting at an angle of about 50° with the midrib, curving upwards to and along the margin; secondary nerves and innovations indistinct; petiole .3 to .5 in. long, bordered above by the decurrent, often erose, margins of the blade. *Inflorescence* a compact, shortly pyramidal, 3 to 4 in. long, squarrosely bipinnate panicle; common peduncle none or scarcely .5 in. long; bracts minute, triangular; branch peduncles .7 to 1 in. long, minutely ferruginous-scaly as is the rachis; pedicels .2 to .3 in. long, slender; buds ovoid, conical; flowers waxy-white, pedicels and rachis pink. *Calyx-lobes* orbicular, .1 in. broad, ciliate, with scarious margins, much overlapping; glandular dots very few, scattered. *Corolla-lobes* shortly connate, ovate, acute, much twisted, .15 in. long; margins thin, denticulate; glands few, large and brown. *Stamens* about two-thirds the length of the corolla-lobes; anthers ovate-acute, .1 in. long, a few large black glands on the back. *Ovary* ovoid, glabrous; style subulate, .15 in. long. *Berry* bright red at first afterwards black, globose, shining, .2 in. in diam., smooth, faintly striate. *Scheff. Myrs.* 84; *Koord. & Val. Bijdr.* V. 268; *Mez Monog. Myrs.* 121.

PERAK: *King's Collector* 771, 5639, 10836.—DISTRIB. Sumatra, *Beccari* 325, 724; *Forbes* 2083 &c.; Java.

20. *ARDISIA LANCEOLATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, and Fl. Ind. ed. Carey & Wall. II. 275. A large glabrous shrub or small tree, reaching 15 to 25 feet in height; branches cylindric, pale, smooth; branchlets sometimes fugaciously ferruginous-scaly. *Leaves* coriaceous; elliptic-oblong or -obovate, shortly acuminate at apex, long-cuneate at base; entire or sometimes slightly crenate near the apex; glabrous on both surfaces; glandular dots large scattered, more numerous near the margins; 6 to 11 in. long, 2 to 3.5 in. broad; midrib prominent beneath, impressed above; main-nerves 12 to 15 pairs, oblique, starting at an angle of about 50° with the midrib, and at first more or less parallel, then arching upwards to join in an irregular intramarginal nerve; secondary nerves similar but shorter, reticulations scarcely prominent,

irregular; petiole .5 to .7 in. long, winged by the decurrent blade, the wings overlapping. *Inflorescence* a spreading, terminal or sometimes sub-axillary, panicle, 4 to 6 in. long; rachis flexuose, angular or flattened; branches stout, flattened, swollen at base, bearing corymbose racemes of about 7-8 flowers; pedicels .6 to 1 in. long, stout, narrowly clavate, striate, minutely ferruginous-pubescent; bracteoles small, obtuse, deciduous. *Calyx-lobes* orbicular, .2 in. in diam., enlarged and spreading in fruit, glabrous or slightly pubescent; margins scarious and fimbriate-ciliate, base thickened; glandular dots many, prominent; tube short. *Corolla* ovate acuminate, pink, much twisted in bud, .35 in. long, of which one-third tube; lobes unequal in size, oblique, dots not prominent. *Stamens* large, shorter than corolla-lobes; anthers ovate acute, dehiscing longitudinally, back with few large usually oblong prominent black glands. *Ovary* globose; style .1 to .2 in. long, subulate, twisted. *Berry* globose, depressed, smooth, .25 to .3 in. in diam., black when dry. Wall. Cat. 2292; A. DC. Prod. VIII. 126; Miq. Fl. Ind. Bat. II. 1025; Clarke in Hook. f. Fl. Br. Ind. III. 519; Mez Monog. Myrs. 122. *A. speciosa*, Bl. Bijdr. 684; A. DC. l.c. 133; Miq. in Pl. Jungh. I. 197 and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 88; Mez Monog. Myrs. 123. *A. purpurea*, Reinw.; Bl. Bijdr. 684; A. DC. l.c. 129; Miq. in Pl. Jungh. I. 197 and Fl. Ind. Bat. 1026; Scheff. Myrs. 88; Koord. & Val. Bijdr. V. 265. *A. Hasseltii*, Blume; Scheff. Myrs. 86; Mez Monog. Myrs. 123. *A. mucronata*, Bl. Bijdr. 685; A. DC. l.c. 126; Scheff. Myrs. 83; Koord. & Val. Bijdr. V. 269; Mez Monog. Myrs. 123. *A. Leschenaultii*, DC. l.c. 133; Miq. Pl. Jungh. I. 197 and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 89. *A. plagioneura*, Scheff. Myrs. 85; Koord. & Val. Bijdr. V. 268.

PENANG: Roxburgh; Curtis 2755. PERAK: Scortechini 1824; Wray 192, 1401, 2480, 2863, 3659; King's Collector 2954, 3200, 4528, 4785, 6586, 6785, 8730, 10049. MALACCA: Griffith (K.D.) 3569, 3579; Derry 512, 1117. JOHORE: Lake & Kelsall 4033. SINGAPORE: Major McNair; Cantley 133; Ridley 6136, 6436.—DISTRIB. Java, Sumatra, Borneo, Celebes.

21. *ARDISIA LITTORALIS*, Andr. Repos. X. t. 630 (1811). A glabrous shrub of succulent character, reaching 8 to 10 feet in height; branches thick, rounded; buds lanceolate. *Leaves* succulent-coriaceous; obovate or oblong-obovate, rounded or bluntly acute or almost lanceolate at apex, cuneate at base; entire; glandular dots many, scattered, inconspicuous; 2 to 5 in. long, 1 to 2.5 in. broad; midrib prominent; main-nerves invisible in the fresh plant, obscure when dry, irregular, 13 to 18 pairs, at an angle of about 60° with the midrib, curved upwards to and along the margin; secondary nerves similar, slender, reticulations

obscure ; petiole .3 in. long, thick, winged by the decurrent margins of the blade, which are often erose or wrinkled. *Inflorescence* of axillary umbellate racemes of about 8 flowers each, racemes shorter than the leaves, about 2 in. long ; common peduncle about 1 in. long, usually recurved ; pedicels .3 in. long, enlarged in fruit to .5 in. and then clavate thickened ; bracteoles oblong, obtuse, deciduous ; flowers rose-coloured, buds conica .4 in. long. *Calyx-lobes* orbicular, .1 in. in diam., ciliate, edges somewhat scarious, elsewhere thickly dotted with black glands, tube rather longer than lobes. *Corolla-lobes* ovate acuminate, oblique, unequal, lineolate and much gland-dotted, .3 in. long ; tube short. *Stamens* nearly as long as corolla-lobes ; anthers ovate, acute, united in a cone, opening longitudinally and obscurely septate in the cells ; filaments short, on broad bases confluent into a ring adherent to the corolla-lobes. *Ovary* sub-globose, ending in a subulate style .3 in. long. *Berry* globose, depressed, .2 in. in diam., smooth, bright red, turning purplish-black when ripe ; black glands many, small. Kurz For. Fl. II. 110 and Journ. As. Soc. Beng. XLVI. II. 226. *A. obovata*, Bl. Bijdr. 688 ; DC. Prod. VIII. 132. *A. humilis*, Clarke in Hook. f. Fl. Br. Ind. III. 529 (not of Vahl. and in part only) ; Mez Monog. Myrs. 127, fig. 20, A-E. *A. umbellata*, Roxb. Hort. Beng. 16 ; Fl. Ind. I. 582 ; Fl. Ind. ed. Carey & Wall. II. 273 ; Lodd. Bot. Cat. t. 531. *A. solanacea*, Wall. Cat. 2283A (part), 2283D (not of Roxb.). *A. polycephala*, Wight III. Ind. Bot. t. 145 (not of Wall.). *Climacandra obovata*, Miq. Pl. Jungh. I. 199, Fl. Ind. Bat. II. 1030 ; Scheff. Myrs. 05 ; Koord & Val. Bijdr. V. 271. *C. littoralis*, Kurz in Journ. As. Soc. Beng. XL. II. 68.

PENANG : Curtis 217 ; Phillips. PERAK : Wray 1866, 2373 ; *Scortechini* 1053 ; King's Collector 4960. MALACCA : Griffith ; Maingay (K.D.) 1010 ; Hervey. KELANTAN : Ridley. PAHANG : Ridley 1638. SINGAPORE : Hullett 331, 649 ; Cantley 153.—DISTRIB. Malay Islands and eastwards to South China and the Philippines ; westwards to Ceylon (C.P. 1803) and Travancore (Wight 1767).

*Climacandra multiflora*, Miq., and *C. salicifolia*, Miq., are probably only varieties of this species, which seems to be a coast shrub only.

22. *ARDISIA KUNSTLERI*, King & Gamble, n. sp. A shrub or small tree, usually 6 to 10 feet high, rising sometimes to 20 feet, and with a stem about 2 to 3 in. in diam. ; branchlets thick, dark brown, uppermost and innovations rusty-pubescent ; leaf-buds lanceolate. *Leaves* coriaceous-chartaceous ; elliptic, or elliptic-oblong, shortly acuminate at apex, cuneate at base ; minutely pubescent or scaly on both surfaces, afterwards glabrate ; entire or obscurely undulate-crenate on the margins



which are somewhat reflexed; glandular dots many, prominent in the areolations of the leaves and along the margins; 8 to 15 in. long, 2·5 to 5 in. broad; midrib slender; main-nerves 20 to 24 pairs, irregularly spaced, starting at an angle of about 65° with the midrib, at first straight then curving upwards to and along the margin where they anastomose; secondary nerves usually one between each pair of main-nerves, reticulations oblique, all raised on the lower surface when dry; petiole 1 to 2·5 in. long, sometimes shorter, thick, channelled above by the decurrent margins of the blade, which are connivent. *Inflorescence* lateral or axillary, a ·5 to ·7 in. long corymbiform minutely pubescent raceme of about 18 to 22 flowers, on a thick flattened peduncle 2 to 4 in. long; bracts small, lanceolate, very early caducous; pedicels slender, clavate, ·7 to 1 in. long, curved upwards in flower downwards in fruit; buds ovoid, ·25 in. long. *Calyx-lobes* orbicular, ·1 in. long, margins scarious ciliate, covered with many black glandular dots; tube shorter than lobes, minutely pubescent without. *Corolla-lobes* dark blue without, pink within, ovate, acute, ·2 in. long, minutely ciliate, prominently dotted, tube ·05 in. long. *Stamens* shorter than corolla-lobes; filaments very short; anthers ovate acuminate, the connective studded on the back with prominent black glands in 2 rows. *Ovary* ovoid, glabrous; style slender, ·15 in. long. *Berry* globose, blueish-black, ·3 in. in diam., faintly striate when dry.

PERAK: *King's Collector* 2207, 2970, 3060, 3264, 4071, 4110, 6486; *Ridley* 9530.

This species is distinguished by its large elliptic leaves, comparatively small flowers, and large fruits, but comes in some respects near to *A. oxyphylla* and in others to *A. solanacea*, and to *A. polycephala*, Wall.

23. *ARDISIA SOLANACEA*, Roxb. Cor. Pl. 27. t. 27 (1795), Hort. Beng. 16, Fl. Ind. I. 580, and Fl. Ind. ed. Carey & Wall. II. 269. A large shrub, reaching 6 to 8 feet in height; bark ash-coloured, branches stout, glabrous, grey, somewhat angular, buds lanceolate. *Leaves* coriaceous; oblong or elliptic-oblong, acuminate at apex, cuneate at base, glabrous, entire; glandular dots many scattered in the areolations of the nerves and especially near the margin; 6 to 10 in. long, 2 to 3·5 in. broad; midrib slender, somewhat impressed above; main-nerves 12 to 20 pairs, unequally spaced, leaving the midrib at an angle of about 60°, at first straight but soon curving upwards to and along the margin and then anastomosing; secondary nerves many, rather prominent as are the reticulations; petiole stout, ·5 to ·8 in. long, channelled above by the decurrent and often connivent margins of the blade. *Inflorescence* of pedunculate corymbiform racemes, bearing 10 to 16 flowers, from the

axils of the upper leaves or of the scars of fallen leaves, 2 to 4 in. long; peduncle 1 to 2.5 in. long, stout, flattened above as is the very short rachis of the raceme; bracteoles concave, thin, prominently gland-dotted; pedicels .7 to 1 in. long, more or less clavate, slender at first, thicker in fruit; buds conical, .4 in. long. *Calyx-lobes* orbicular, ciliate, scarious on the margins, .15 to .2 in. long, prominently black-gland-dotted; tube nearly equal to lobes. *Corolla-lobes* pink, ovate, rounded, .3 to .35 in. long, prominently gland-dotted, minutely ciliate on the margins, otherwise glabrous; tube extremely short. *Stamens* about two-thirds the length of the corolla-lobes; filaments short, stout, conical; anthers ovate-sagittate, .2 in. long, acute, apiculate, the back of the connective studded with prominent large black glands in a double row. *Ovary* ovoid, glabrous; style slender, .25 in. long. *Berry* globose, dark blue or black, .3 in. in diam. Willd. Sp. Pl. I. 1063; Bot. Mag. t. 1677; Wall. Cat. 2283 A-K; Mez Monog. Myrs. 132, fig. 20 F-K; Cooke Bomb. Fl. II. 86. *A. humilis*, A. DC. in Trans. Linn. Soc. XVII. 118 (*not of* Vahl); Wight Ic. t. 1212; Dalz. & Gibs. Bomb. Pl. 137; Clarke in Hook. f. Fl. Br. Ind. III. 529 (*in part*); Brandis For. Fl. 287; Kurz in Journ. As. Soc. XLVI. II. 226, and For. Fl. II. 100; Prain Beng. Pl. 645. *A. elliptica*, Bedd. Fl. Sylv. p. CXXXVIII. (*not of* Thunb.).

PERAK: *Wray* 1900, 3000; *King's Collector* 6011.—DISTRIB. India, Burma.

*VAR. elata*, King & Gamble. A small tree reaching 25 to 35 feet in height, and 6 to 8 in. in diam. *Leaves* thinner, oblong-lanceolate; main-nerves less prominent than in the type. *Inflorescence* with rather longer stouter peduncles and more numerous flowers. *Berry* slightly larger.

PERAK: *Scortechini* 679; *King's Collector* 4717, 5770.

This variety is scarcely worthy of being classed as such, but, at any rate in the herbarium, the specimens are easily separable.

24. *ARDISIA LURIDA*, Blume Bijdr. 687 (1826). A large shrub, reaching 20 feet in height and 3 to 4 in. in diam. of stem; branchlets thick, glabrous, as are the lanceolate acuminate leaf-buds. *Leaves* entire, coriaceous; lanceolate- or sub-obovate-oblong, shortly acuminate at apex, gradually cuneate at base; glabrous and dark green above, pale and ferruginous-brown beneath; glands many, regularly scattered in the areoles of the net venation; 5 to 10 in. long, 1.5 to 2.5 in. broad; midrib prominent; main-nerves 16 to 20 pairs, slender, irregular, starting at about 60° with the midrib, parallel at first and then arched up to and along the margin where they meet; secondary nerves similar, reticulations obscure; petiole .4 to .7 in. long, winged by the decurrent edges of the blade, the

wings connivent above when dry. *Inflorescence* a short (2 to 3 in. long), axillary, few-flowered, sub-umbellate, minutely ferruginous-pubescent, peduncled raceme; peduncles 1 to 1.5 in. long, flattened; pedicels .4 to .6 in. in flower, longer in fruit and then clavate; flowers large, waxy, pinkish-white; buds rounded, .4 to .5 in. long. *Calyx-lobes* ovate-orbicular, emarginate, scarious and ciliate at the edges, puberulous outside, .2 in. in diam., glandular dots conspicuous, of various sizes, black and brown mixed; tube short. *Corolla-lobes* ovate, obtuse, oblique, concave and keeled, .4 in. long, .2 in. broad, glandular dots and lineoles prominent, tube very short. *Stamens* two-thirds as long as petals; anthers hastate, mucronate, opening by longitudinal slits, prominently dotted on the back with large black glands. *Ovary* rounded, ending in a short subulate style. *Berry* globose, apiculate, .4 in. in diam., smooth, gland-dotted. A. DC. Prod. VIII. 130; Miq. Fl. Ind. Bat. II. 1019; Scheff. Myrs. 71; Koord. & Val. Bijdr. V. 245; Mez Monog. Myrs. 130.

PERAK: Ridley 7172, 10319.—DISTRIB. Java.

25. *ARDISIA OXYPHYLLA*, Wall. Cat. 2291 (1829). A shrub; branchlets rounded, smooth; buds narrowly lanceolate, glabrous. *Leaves* chartaceous; elliptic, acute or shortly acuminate at apex, acutely narrowed at base, entire; glabrous above, glabrous beneath except for a few minute scales; glandular dots many, especially near the margin; 3 to 7 in. long, 1 to 2.5 in. broad; midrib slender, prominent; main-nerves about 16 pairs, irregular, usually at about an angle of 60° with the midrib, more or less parallel at first, then arching nearly to the margin; secondary nerves slender, like the main-nerves, reticulations irregular; petiole .4 to .7 in. long, winged by the decurrent margins of the blade. *Inflorescence* an axillary, long-peduncled, short, few-flowered (5 to 8) subumbellate raceme, about 2 to 4 in. long; peduncles 1 to 2 in. long, angular when dry; pedicels .4 in. long, .7 in. in fruit, slender; buds rounded, .3 in. long. *Calyx-lobes* ovate-rotundate, obtuse, .1 in. in diam., ciliate on the scarious edges, prominently dotted with numerous black and brown glands; tube short. *Corolla-lobes* broadly ovate, sub-acute or obtuse, oblique, .25 to .3 in. long, prominently dotted with many black or brown round glands and fewer elongate lineolate ones. *Stamens* nearly as long as corolla-lobes, almost quite sessile; anthers sagittate, long-acute, the connective prominently marked on the back with large black conspicuous glands. *Ovary* rounded, ending in a short .15 in. long style, glabrous. *Berry* globose, .3 in. in diam., fleshy, smooth. A. DC. in Trans. Linn. Soc. XVII. 120, Prod. VIII. 130; Clarke in Hook. f. Fl. Br. Ind. III. 528 *variety excepted*; Stapf in Trans. Linn. Soc. Ser. 2. IV. 204; Mez Monog. Myrs. 131.

PENANG : *Wallich* 2291 ; *Curtis* 668 ; *Ridley* 7093. PERAK : *King's Collector* 5624, 5913, 5929, 6185, 8218, 10504. PROVINCE WELLESLEY : *Ridley* 6953.—DISTRIB. Andamans or Tenasserim, *Helfer* (K.D.) 3571, 3585 ; Borneo.

26. *ARDISIA SCORTECHINII*, King & Gamble, n. sp. A tree reaching 40 to 50 feet in height and 8 to 12 in. in diam. ; branchlets round, dark brown, lenticellate, leaf-buds acuminate. *Leaves* entire, coriaceous ; obovate, acute at apex, cuneate at base ; glabrous, margins incurved ; glandular dots many, obscure ; 5 to 7 in. long, 1.5 to 2 in. broad ; midrib prominent slender ; main-nerves 14 to 16 pairs, very oblique, at about 30° to the midrib, curved upwards and joining parallel to the margin ; secondary nerves similar but more slender, reticulations curved, surrounding the dots ; petiole .4 in., rather broadly edged by the decurrent margins of the blade, which are nearly connivent above ; stipules leafy, more or less persistent. *Inflorescence* 2 in. long, of short axillary peduncled, umbellate racemes 8–12-flowered, in the axils of short leafy bracts ; peduncles thick, about 1 in. long, flattened ; pedicels .5 in., thickened and longer in fruit ; bracteoles ovate, acute, boat-shaped, deflexed, persistent ; flowers reddish-pink. *Calyx-lobes* orbicular, obtuse, .2 to .25 in. long, emarginate, ciliate, scarious on the edges, with many parallel veins and many prominent round or oblong mixed black and brown glandular dots ; tube short. *Corolla-lobes* ovate, acute, oblique, .35 in. long, unequal, with very few dots, some round some lineolate, tube very short. *Stamens* shorter than corolla-lobes ; anthers long acuminate, villous on the connective on both sides, back marked with large black glands ; filaments short, very thick. *Ovary* ovoid, surmounted by the conical, subulate, .2 in. long, glabrous style. *Berry* globose, smooth, .3 in. in diam., bluish black.

PERAK : *Scortechini* ; *King's Collector* 4662, 4672—on rich soil, in dense jungle, up to 800 feet.

27. *ARDISIA PENDULA*, Mez Monog. Myrs. 125 (1901). Apparently a shrub ; branchlets thick, glabrous below, ferruginous-pubescent at the extremities, leaf-buds lanceolate, ferruginous-pubescent. *Leaves* chartaceous ; elliptic lanceolate, long acute at apex, cuneate at base ; entire but sometimes very faintly crenate near the apex ; glabrous above, glabrous or slightly ferruginous-pubescent beneath ; glandular dots scattered, more numerous and prominent near the margins ; 4 to 7 in. long, 1.5 to 2 in. broad ; midrib slender ; main-nerves 10 to 12 pairs, irregular, starting from the midrib at about an angle of 60°, then arching upwards and joining near the margin ; secondary nerves slender, minor nerves reticulate ; petiole .3 to .5 in. long, winged by the decurrent edges of the blade. *Inflorescence* of 3 to 5 in. long axillary peduncled ferruginous-



pubescent racemes; peduncles about 2 in., pedicels .4 to .5 in. long, curved. *Calyx-lobes* ovate, rounded, with many glandular dots, .1 in. long; tube short. *Corolla-lobes* ovate-elliptic, rounded, much gland-dotted. *Stamens* shorter than the petals; anthers acute, dotted on the back; filaments very short. *Ovary* ovoid, glabrous. *Berry* globose, black when dry, .25 in. in diam., much gland-dotted. *A. attenuata*, Miq. Fl. Ind. Bat. II. 1020 and Suppl. I. 575 (not of Wall.); Scheff. Myrs. 68. *A. reclinata*, Blume; Scheff. l.c.

MALACCA: Goodenough 1295.—DISTRIB. Java, Sumatra. A poor specimen only available.

28. *ARDISIA HULLETTII*, Mez Monog. Myrs. 130 (1901). Apparently a shrub; branchlets light brown, round, smooth; leaf-buds lanceolate, glabrous, black. *Leaves* membranous; oblong-lanceolate, acuminate at apex, acuminately narrowed at base; entire, glabrous on both surfaces; glands light-brown, large, in the areoles of beautifully netted venation; 4 to 7 in. long, 1.5 to 2 in. broad; midrib slender; impressed above; main-nerves many, slender, irregular, 20 to 24 pairs, parallel at first and then arching upwards and joining in a narrow intramarginal ring; secondary nerves many, like the main-nerves, reticulations numerous; petiole .4 in. long, slender, only very narrowly winged. *Inflorescence* an axillary, short, few- (1-5) flowered, glabrous, umbellate raceme, peduncle .5 to .7 in. long; pedicels .5 in. long, recurved, more or less clavate; buds conical, .3 to .4 in. long. *Calyx-lobes* scarcely overlapping, ovate-orbicular, ciliate, .1 to .15 in. long, minutely gland-dotted; tube short. *Corolla-lobes* ovate-acuminate, upper edges incurved, oblique, unequal, many-nerved, sparsely black-gland-dotted; tube very short. *Stamens* a little shorter than the corolla-lobes; anthers oblong, mucronate, with 2 lines of prominent black glands on the back; filaments short, spreading at base. *Ovary* ovoid, thick, glabrous; style short, subulate. *Berry* brown, smooth, globose, .2 in. in diam., seed white-ringed at base.

MALACCA: on Mount Ophir, *Hullett* 769, 778.

29. *ARDISIA OBLONGIFOLIA*, King & Gamble, n. sp. A shrub; branchlets brown, glabrous, with faint decurrent raised lines from either side of the insertion of the leaf-petioles; leaf-buds lanceolate acuminate. *Leaves* chartaceous; oblong, acute at apex, cuneate at base; glabrous, entire; glandular dots scattered but not prominent except near the margins which are reflexed; 7 to 10 in. long, 2 to 2.5 in. broad; midrib prominent, impressed above; main-nerves 22 to 26 pairs, starting at an angle of nearly 80° from the midrib, at first straight and near the margin curving upwards to and along it; secondary nerves many, usually at least 1 to 2 between each pair of main-nerves, reticulations in an elegant network;

petiole rather slender, .8 to 1 in. long, bordered above by the decurrent margins of the blade. *Inflorescence* an axillary corymbose raceme of about 8 flowers and about .5 in. long on a 1.5 to 2 in. long flattened peduncle; pedicels .75 in. long, clavate. *Calyx-lobes* orbicular, ciliate, gland-dotted, about .1 in. long; tube as long: rest of flowers unknown. *Berry* globose, .2 in. long, glandular-dotted.

PERAK: at 1,000 feet, *Wray* 3797.

30. *ARDISIA TETRASEPALA*, King & Gamble, n. sp. A shrub; branchlets slender, pale brown, with indistinct raised lines from the sides of the leaf-petioles, sinuate, slightly scaly above. *Leaves* chartaceous; elliptic or elliptic-ovate, gradually acuminate at apex, rounded at base; glabrous above, pale brown when dry, very slightly pubescent on and near the midrib beneath; glandular dots many scattered, prominently raised on the upper surface, margins slightly recurved; 4.5 to 6.5 in. long, 1.5 to 2.5 in. broad; midrib prominent below; main-nerves about 16 to 20, irregularly spaced, starting at an angle of 60° from the midrib, curved upwards, dividing and anastomosing with the secondary nerves in a marginal network, all raised beneath; petiole .2 to .3 in. long, channelled above. *Inflorescence* a pseudo-terminal subumbellate 8-12-flowered scarcely .2 in. long raceme in the axil of the uppermost leaf; peduncle about .5 in. long, pedicels slender, about .5 in. long. *Calyx-lobes* 4, ovate-orbicular, ciliate, gland-dotted, about .1 in. long, reflexed in fruit: rest of flower unknown. *Berry* globose, .25 in. in diam., black when dry and prominently dotted with oblong glands.

JOHORE: at Jaffaria and Gunong Palai, 1,500 feet, *G. King*.

We place this species in *TINTUS* instead of in *TINOPSIS* because not only does the inflorescence seem to be only apparently terminal but its sub-umbellately racemose character seems to approximate more nearly to that of the former section.

31. *ARDISIA BIFLORA*, King & Gamble, n. sp. A small shrub, 4 to 8 feet high; branches smooth, pale brown; branchlets divaricate, slender. *Leaves* chartaceous; oblong-lanceolate, acuminate at both apex and base; glabrous; entire or very faintly crenulate; glandular dots many, black, large, in the areoles of the reticulations; 3 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 12 to 14 pairs, at an angle of about 55° with the midrib, curving upwards to and along the margin where they meet in a wavy intramarginal nerve; secondary nerves many, reticulations irregular; petiole slender, .2 to .5 in. long, sometimes longer. *Inflorescence* a lateral, 2-flowered, pedunculate umbel, 1.5 in. long; peduncle and pedicels each .75 in. long, slender. *Calyx-lobes* ovate, scarious and ciliate on the margins, prominently gland-dotted, .05 in. long; tube as long: rest of flower unknown. *Berry*

black, globose, .25 in. in diam., ribbed and prominently gland-dotted.

PERAK : in dense jungle on limestone hills at 300 to 800 feet, *King's Collector* 4296, 4711 ; *Wray* 3343. It is very near *A. paupera*, Mez, of Sumatra, but the long slender peduncle and pedicels distinguish it.

A specimen collected by Scortechini (without number) has similar leaves, but the inflorescence is pseudo-terminal and branched, with more than 2 flowers and very short pedicels.

Ridley's No. 2670 from Pahang seems to be *Ardisia rhynchophylla*, Clarke, but the specimen is imperfect, and we hesitate to describe it as a Malay plant.

32. *ARDISIA TAHANICA*, King & Gamble, n. sp. A shrub (?) ; branchlets brown, shining, somewhat flattened ; innovations scaly and hirsute, leaf-buds ferruginous-pubescent, lanceolate. *Leaves* chartaceous ; linear-lanceolate, acuminate at both ends ; glabrous above, scaly beneath and slightly pubescent along the midrib ; margins entire, recurved ; glandular dots numerous, scattered, conspicuous on the under surface ; 4 to 6 in. long, .7 to .9 in. broad ; midrib slender ; main-nerves obscure, about 12 pairs, starting at a very oblique angle and curving upwards to and along the margin ; secondary nerves similar, reticulations obscure ; petiole slender, .4 to .6 in. long. *Inflorescence* an umbellate peduncled raceme, 1.5 to 2 in. long, from the axils of some of the upper leaves ; peduncle slender, .7 to 1.2 in. long ; flowers about 5-8, pedicels slender, .5 in. long. *Calyx-lobes* semi-orbicular, scarious and ciliate on the margins, rusty-pubescent on the back and with many glandular dots, .05 in. long ; tube as long as lobes : rest of flower not seen. *Berry* globose, depressed, .2 in. in diam., prominently striate.

PAHANG : *Ridley* 2669, in Tahan woods.

*Goodenough* No. 10552, from Selangor, is also possibly the same species, but the leaves reach 1.5 in. in breadth and the peduncle and pedicels are stouter.

33. *ARDISIA VILLOSA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 582, and Fl. Ind. ed. Carey & Wall. II. 274. A small shrub, reaching 6 to 8 feet in height ; branchlets rounded, from nearly glabrous to densely ferruginous-pilose, the hairs moniliform. *Leaves* chartaceous ; oblong-lanceolate or lanceolate, acute or acuminate at apex, cuneate at base ; more or less distinctly but shallowly crenate, the crenations broad, margins recurved ; glabrous to minutely rusty-hirsute above, densely red-villous beneath, especially on the nerves ; glandular dots many, black, prominent ; 4 to 8 in. long, .75 to 2.5 in. broad ; midrib prominent ; main-nerves 8 to 12 pairs, very irregular, slender, obscure, arching upwards and ending in the crenature-glands ; secondary nerves similar, meeting the main-nerves, reticulations faint ; petiole .4 to .8 in.

long, rusty-villous. *Inflorescence* a sessile or short-peduncled, more or less rusty-villous, umbellate raceme at the end of the main branchlets or at the ends of long-peduncled axillary 2-leaved branchlets; bracts ovate-lanceolate, .1 to .2 in. long, deciduous; pedicels .3 to .4 in. long, secund; buds conical. *Calyx-lobes* pink, linear-oblong or lingulate, obtuse or slightly acute, .25 to .3 in. long, .075 in. broad, glabrous to thickly rusty-villous, apex often recurved, glandular lines and dots scattered; tube exceedingly short. *Corolla-lobes* pale pink, ovate-acute or -acuminate, .25 to .3 in. long, prominently dotted with round or oblong glands, much twisted in bud; tube short. *Stamens* shorter than the petals, .2 in. long; anthers ovate, acuminate, dehiscing by wide pores in the upper half; filaments very short. *Ovary* globose, crowned by a slender .2 in. long style, the base of the style and top of ovary minutely pubescent. *Berry* globose, .25 in. in diam., bright red, sparingly pubescent. A. DC. Prod. VIII. 136; Wall. Cat. 2280A; Miq. Pl. Jungh. 191, Fl. Ind. Bat. II. 1017; Scheff. Myrs. 90; Kurz in Journ. As. Soc. Beng. XLVI. ii. 227 and For. Fl. II. 113; Clarke in Hook. f. Fl. Br. Ind. III. 525 *var. excepted*; Koord. & Val. Bijdr. V. 253. *A. vestita*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 274; A. DC. l.c.; Miq. l.c.; Mez Monog. Myrs. 141. *A. mollis*, Bl. Bijdr. 689. *A. tavoyana*, A. DC. in Trans. Linn. Soc. XVII. 125.

PENANG: *Maingay* (K.D.) 1011; *Ridley* 9357; *Curtis* 1597. PERAK: *Scortechini* 638; *Wray* 151, 862, 2967, 3149; *King's Collector* 1819, 3138, 6104, 6448, 7915, 10052. PAHANG: *Ridley* 2176. SELANGOR: *Ridley* 1558; *Curtis*. MALACCA: *Griffith* (K.D.) 3588; *Hervey*; *Ridley*; *Cuning* 2390. SINGAPORE: *Ridley*, 2833, 2816.—DISTRIB. Burma, Sumatra, Java, Borneo, and eastwards to Tonkin and Hainan.

VAR. *glabrata*, Kurz l.c. *Leaves*, at least when full grown, glabrous. *Calyx* glabrous or nearly so. Stapf in Trans. Linn. Soc. Ser. 2, IV. 204. *A. glabrata*, Bl. Bijdr. 692; A. DC. Prod. VIII. 136; Miq. Fl. Ind. Bat. II. 1022.

PERAK: *Ridley* 2899; *Wray* 2801, 3414; *King's Collector* 949, 4612, 6188, 6255, 7696; *Scortechini* 315.—DISTRIB. Java, Sumatra, Borneo.

*Ridley's* 5510 from Kedah seems to be a form of this with smaller leaves and shorter calyx-lobes, but can hardly be separated as a second variety.

34. *ARDISIA VIRENS*, Kurz For. Fl. II. 575 (1877), and Journ. As. Soc. Beng. XLVI. ii. 226. A small glabrous shrub; branchlets slender, pale, somewhat compressed and twisted. *Leaves* membranous, oblong or oblong-lanceolate, acuminate at apex, cuneate at base; faintly



crisped-crenulate with large glands in the crenulations; pale and glabrous on both surfaces; glandular dots scattered, in the areoles of the reticulations; 4 to 6 in. long, 1.5 to 2 in. broad; midrib prominent, somewhat impressed above; main-nerves about 12 to 14 pairs, irregular and irregularly spaced, usually starting at an angle of about 60° with the midrib, at first straight, branching and joining in an intramarginal nerve close to the margin and passing through the crenature glands; secondary nerves many, slender, reticulations many, curved; petiole .4 to .6 in. long, winged by the decurrent margins of the blade. *Inflorescence* an almost sessile terminal corymb, composed of long-peduncled sub-umbellate racemes; peduncles 1 to 1.5 in.; pedicels .5 to .8 in. long; buds conical .25 in. long. *Calyx-lobes* oblong, obtuse, thin, .075 in. long, conspicuously dark-brown-gland-dotted; tube short. *Corolla-lobes* ovate, bluntly acuminate, oblique, unequal, conspicuously marked by few dark brown lines and dots, .3 in. long; tube very short. *Stamens* shorter than corolla-lobes, .2 in. long, obtusely hastate; anthers opening by broad longitudinal slits, conspicuously black-gland-dotted on back; filaments short. *Ovary* rounded, style slender, .2 in. long. *Berry* globose, pale, somewhat depressed, .3 to .4 in. in diam., conspicuously marked with round or oblong purple dots, somewhat fleshy. Clarke in Hook. f. Fl. Br. Ind. III. 524; Stapf in Trans. Linn. Soc. Ser. 2, IV. 203; Mez Monog. Myrs. 147.

PERAK: Wray 1444 at 2,000 feet.—DISTRIB. Assam, Cachar, Manipur, Yunnan, Borneo.

35. *ARDISIA WRAYI*, King & Gamble, n. sp. A single-stemmed treelet or shrub reaching 5 feet in height, but usually smaller; upper part of stem .25 in. thick, brown, with spongy bark and scurfy scales; leaf-buds glabrous, lanceolate-acuminate. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, long cuneate at base; margins recurved; somewhat scaly on both surfaces, scurfy along the midrib beneath; glandular dots prominent scattered; broadly crenate, the crenatures shallow with large glands; deep green above, red or purple beneath; 6 to 10 in. long, 1.5 to 3 in. broad; midrib slender; main-nerves 12 to 20 pairs, irregular in angle and distance, curving upwards to and along the margin where they or their branches end in the glands of the crenatures; secondary nerves few, reticulations many scarcely prominent; petiole .7 to 1.3 in. long, somewhat flattened, bordered by the decurrent margins of the blade. *Inflorescence* of glabrous sub-umbellate racemes from the axils of the uppermost leaves, usually crowded so as to present almost the appearance of a terminal cluster; peduncles usually .5 in. long, occasionally shorter but often longer, even up to 2 in., flattened; racemes very short, much marked by the scars of very

caducous bracteoles; flowers 8 to 12; pedicels slender below, flattened above, twisted and curved, .3 to .4 in. long; buds ovoid. *Calyx-lobes* ovate, acute, .1 in. long, prominently black-gland-dotted. *Corolla-lobes* waxy, reddish or purple, ovate, .15 to .2 in. long, sparsely gland-dotted. *Stamens* nearly as long as corolla-lobes; filaments very short, thick; anthers ovate, acute, connective much gland-dotted on back. *Ovary* rounded; style short, slender, glabrous. *Berry* globose, red, rugose, .3 in. in diam., prominently gland-dotted when dry.

PERAK: *Wray* 438, 2795, 3280, 4051; *Scortechini* 418; *King's Collector* 1888, 3631, 6938, 7514, in dense jungle on rich soil, both in low-level localities and up to 4,000 feet in the mountains; one specimen, rather more slender, thinner and more glabrous, from the top of rocks (K.C. 7514).

K.C. No. 6938 from mountains at 3,000 to 4,000 feet, has the main-nerves nearly at right angles to the midrib, while other specimens have it at 60° or even 45°; these are, however, intermediate, and all that can be said is that the character is a variable one. The species seems to resemble the *A. macrocarpa*, Wall., of Northern India, in its habit of growth.

36. *ARDISIA MINOR*, King & Gamble, n. sp. Apparently a short (12 to 18 in. high) treelet or undershrub; lower part of stem with side rootlets; stem .2 to .25 in. thick, rusty-pubescent, dark brown. *Leaves* coriaceous; elliptic, long caudate-acuminate at apex, attenuate or cuneate at base often unequally; margins recurved, very shallowly crenate, the crenatures with large prominent glands; glabrous on both surfaces but somewhat scaly; 5 to 7 in. long, 2 to 2.5 in. broad; midrib slender; main-nerves about 15 pairs, starting at an angle of about 50° with the midrib, and thence straight to the margin where they or their branches end in the crenature glands; secondary nerves similar to the main-nerves, reticulations oblique, all raised beneath when dry; petiole thick, rugose, rusty-pubescent, .7 to 1 in. long, winged by the decurrent margins of the blade. *Inflorescence* of very short, rusty-pubescent, umbellate racemes of about 5 to 6 flowers from the axils of the uppermost leaves; peduncle scarcely .2 in. long, thick; racemes about .2 in. long; bracteoles many, ovate or oblong, recurved; pedicels thick, .3 to .4 in. long, flattened, recurved. *Calyx-lobes* ovate acute, .1 to .15 in. broad, glabrous, prominently gland-dotted, nearly free. *Corolla-lobes* ovate acute, .2 in. long, glabrous, dotted prominently with large black glands. *Stamens* shorter than corolla-lobes; filaments very short, thick; anthers oblong acuminate, the connective gland-dotted at the back, .1 in. long. *Ovary* rounded, glabrous; style .1 in. long, subulate. *Berry* not known.

PERAK: *Scortechini*.

Very near *A. Wrayi*, but differs especially in the coriaceous leaves and the shorter and much thicker pedicels.

37. *ARDISIA PERAKENSIS*, King & Gamble, n. sp. A small bush; branchlets pale brown, smooth, wrinkled when dry; innovations densely rusty-glandular-pubescent. *Leaves* membranous; elliptic-lanceolate, long acute both at apex and base; nearly glabrous on both surfaces but with small peltate scales, young leaves rusty-glandular-pubescent; margin slightly recurved, shortly and shallowly crenate or nearly dentate except on the lower third and at the apex, glands in the crenatures present, obscure; glandular dots absent or very sparse; 2.5 to 4 in. long, .75 to 1.25 in. broad; midrib slender; main-nerves about 16 pairs, rather irregular in angle and distance, meeting near the margin in an irregularly looped intramarginal nerve, reticulations many, transverse, all raised on lower surface; petiole slender, .2 to .4 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of small, 2-3-flowered, rusty-glandular, pubescent, pedunculate umbels from the axils of upper leaves or of reduced bract-like leaves; peduncles .3 in. long; pedicels .1 to .2 in. long; bracteoles ovate, minute; buds ovoid, pale pink. *Calyx-lobes* triangular-ovate, acute, minutely pubescent and gland-dotted, .05 in. long. *Corolla-lobes* ovate, acute, .1 to .15 in. long, glabrous, sparsely black-gland-dotted. *Stamens* a little shorter than corolla-lobes; filaments almost none; anthers ovate, acute, .1 in. long. *Ovary* rounded, glabrous; style subulate, .075 in. long. *Berry* not known.

PERAK: at 300 feet in Upper Perak, Wray 3462.

38. *ARDISIA MEZIANA*, King & Gamble, n. sp. A herbaceous under-shrub, 1 to 2 feet in height, stem 2 in. in diam.; bark soft, pale brown, upper parts and innovations rusty-glandular pubescent. *Leaves* chartaceous; elliptic-obovate, shortly and abruptly acuminate at apex, cuneate at base; glabrous above, sparsely glandular-pubescent beneath; margins rather narrowly crenate-dentate except in the lower third to half and at the acumination, recurved, glands in the crenatures obscure; glandular dots many, scattered, inconspicuous; 3.5 to 5.5 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves 10 to 14 pairs, at an angle of about 60° with the midrib, at first straight afterwards curved upwards to anastomose near the margin; secondary nerves few, reticulations oblique, all more or less raised on both surfaces when dry; petiole .3 to .5 in. long, somewhat thickened below, densely rusty-glandular-pubescent. *Inflorescence* of very short, sessile, rusty-glandular-pubescent racemes of about 6 flowers each, in the axils of the leaves all

down the stem, the racemes .1 to .15 in. long; bracteoles ovate, scarious, conspicuously black-gland-dotted and ciliate; pedicels short, .1 to .15 in. long, stout; buds ovoid; flowers waxy-white. *Calyx-lobes* 5, ovate, acute, ciliate, hyaline, with conspicuous black dots, .05 in. long; tube as long as lobes. *Corolla-lobes*, ovate, blunt, .1 in. long, conspicuously black-gland-dotted; tube very short. *Stamens* nearly as long as corolla-lobes; filaments short, thick; anthers ovate-lanceolate, long apiculate, the connective studded on the back with large black glands. *Ovary* rounded, style filiform as long as corolla. *Berry* not seen.

PERAK: on limestone rocks in open jungle at 500 to 800 feet, *King's Collector* 5838.

We have dedicated this well-marked species to C. Mez, whose Monograph of MYRSINÆE has done so much for the elucidation of the Natural Order, and whose study of *Ardisia* in particular has been of so much help to us.

39. *ARDISIA RIDLEYI*, King & Gamble, n. sp. A slender shrub or treelet, reaching 10 to 15 feet in height and about 1 in. in diam.; branchlets dark brown, slender, minutely ferruginous-pubescent; leaf-buds lanceolate, densely ferruginous-pubescent. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, acuminate or somewhat rounded at base; prominently crenate, the crenatures usually regular, margin slightly recurved; glabrous on both surfaces; glandular dots few, scattered; 4 to 8 in. long, 1.25 to 1.75 in. broad; midrib slender; main-nerves about 12 pairs, at irregular angles and spaces, ending in the crenatures of the margin; secondary nerves and reticulations obscure; petiole .2 to .7 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a 3-6-flowered, sessile, umbellate raceme in the axil of the uppermost leaf of the branchlets; raceme about .2 in. long; pedicels slender, .7 to 1.4 in. long, minutely rusty-pubescent; buds ovoid, acute. *Calyx-lobes* 5, broadly triangular, acute, .075 in. long, sparsely black-gland-dotted, rusty-pubescent. *Corolla-lobes* broadly ovate, acute, .15 in. long, glabrous, densely and closely black-gland-dotted. *Stamens* a little shorter than the corolla-lobes; filaments very short, thick; anthers oblong, hastate, mucronate, .1 in. long. *Ovary* rounded, glabrous, style slender, .05 in. long. *Berry* dark red, ovoid, apiculate, sparsely striate and gland-dotted, .25 to .3 in. in diam.

PERAK: in dense forest at 2,500 to 4,500 feet, *Wray* 209; *King's Collector* 5019. SELANGOR: *Ridley* 8534. SINGAPORE: *Ridley* 6434.

Very like *A. crenata* var. *angusta* but has broader and thinner leaves, differently nerved.

40. *ARDISIA CRENATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583,



and Fl. Ind. ed. Carey & Wall. II. 276. An evergreen small glabrous shrub; branchlets thick, somewhat fleshy, striate with faint lines decurrent from the bases of the leaves; leaf-buds small, conical. *Leaves* chartaceo-coriaceous; lanceolate to oblong-lanceolate, acute or sub-obtuse at apex, acuminate narrowed at base; margins crispately crenate with glands in the crenatures, recurved; glabrous on both surfaces; glandular dots scattered in the areoles of minor nerves, sometimes prominent, often obscure; 2 to 4 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 10 to 14 pairs, irregular, slender, arching upwards and joining in an intramarginal nerve close to the margin which passes through the crenature glands; secondary nerves similar but fainter, reticulations curved; petiole .2 in. long, narrowly winged by the crisped edges of the decurrent blade. *Inflorescence* of short, sessile or shortly peduncled, panicked racemes, springing from the branchlets just below the terminal pair of leaves; pedicels .2 to .4 in. long, slender, longer and thicker in fruit, generally recurved; buds conical, .15 to .2 in. long; flowers 4- or 5-merous, waxy pink or white. *Calyx-lobes* ovate, .05 to .1 in. long, scarious at the edges, dotted with black glands in the middle; tube very short. *Corolla-lobes* rose-pink, ovate-oblong, bluntly acuminate, .2 in. long, oblique, unequal, sparsely dotted with round or elongated glands, sometimes papillose at the base within. *Stamens* shorter than corolla-lobes; anthers ovate-oblong, acute, with few glands on the back; filaments very short. *Ovary* ovoid, surmounted by a twisted subulate slender style .15 in. long. *Berry* globose, .25 in. in diam., scarlet, succulent, obscurely striate, crowned by the persistent style. Wall. Cat. 2262; Bot. Mag. t. 1950; Clarke in Hook. f. Fl. Br. Ind. III. 524; Koord. & Val. Bijdr. VI. 190. *A. glandulosa*, Bl. Bijdr. 690 (not of Roxb.). *A. crenulata*, Lodd. Bot. Cat. t. 2 (not of Vent.). *A. crispa*, A. DC. in Trans. Linn. Soc. XVII. 124 and Prod. VIII. 134; Scheff. Myrs. 72; Miq. Fl. Ind. Bat. II. 1020; Kurz in Journ. As. Soc. Beng. XLVI. ii. 226 and For. Fl. II. 113; Mez Monog. Myrs. 144, fig. 22. *A. densa* and *A. polysticta*, Miq. Fl. Ind. Bat. Suppl. 575, 576. *Bladhia crispa*, Thunb. Fl. Jap. 97; Kaempf. Ic. Pl. Jap. t. 7.

KEDAH: Ridley 5517. PENANG: Wallich 2262; Maingay (K.D.) 1009; Phillips; Curtis 337; Deschamps; G. King; J. Scott. MALACCA: Griffith (K.D.) 3583/1; Cuming 2254; Hullett 637; Derry 944. PERAK: Scortechini; Wray, 1257; King's Collector 1337, 4180, 4903, 7847, 8706, 10566. SELANGOR: Ridley 10553. PAHANG: Ridley 24; Havi-land. JOHORE: Fox 11285.—DISTRIB. Assam, Burma, Sumatra, Java, Borneo, and eastwards to South China and Japan. Ridley (Trans. Linn. Soc. III. (1893) 317) says the berries are "sweet and eatable."

VAR. *angusta*, Clarke, l.c. *Leaves* narrowly lanceolate; flowers in a simple umbellate raceme, pedicels divaricate, buds obtuse.

MALACCA: *Griffith* (K.D.) 3584.

41. *ARDISIA ROSEA*, King & Gamble, n. sp. A small shrub reaching 4 to 6 feet in height; branchlets divaricate, purplish-brown when dry, glabrous; buds lanceolate. *Leaves* membranous; elliptic, cuspidately acuminate at apex, cuneate at base; broadly crenate with shallow crenatures and prominent glands, the margin recurved; glabrous on both surfaces; glandular dots extremely numerous, prominent on the under surface which is paler than the upper when dry; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves obscure, 8 to 12 pairs, irregular, branching and usually ending in the crenature-glands; secondary nerves and reticulations indistinct; petiole red, slender, .25 to .5 in. long, bordered by the decurrent crisped margins of the blade. *Inflorescence* a corymbiform terminal or pseudo-terminal panicle of umbellate racemes, the branches divaricate, minutely rusty-pubescent; common peduncle, above the last leaf, short, about .05 in.; branch peduncles slender, .5 to 1 in. long; pedicels slender, .2 to .4 in. long, up to .5 in. long in fruit, flattened in flower; flowers in each umbel about 12, usually recurved; buds ovoid, acute. *Calyx-lobes* 5, triangular-ovate, .05 in. long, glabrous, not glandular; tube as long as lobes, lobes reflexed in fruit. *Corolla-lobes* waxy-white tinged with pink, or pink only, ovate-acuminate, .2 in. long, much twisted to the left, not glandular. *Stamens* nearly as long as corolla-lobes; filaments slender, .05 in. long; anthers ovate, blunt, .1 in. long, with very few glands. *Ovary* rounded, glabrous; style filiform, .15 in. long. *Berry* black, globose, .25 in. in diam., smooth, tipped with the long slender persistent style.

PERAK: *Wray* 32, 402; *Scortechini* 295, 664; *Ridley* 5511, 9720; *King's Collector* 3247, 6247, 8057; in dense forests in the mountains from 3,000 feet elevation to the top of Gunong Batu at 6,700 feet.

42. *ARDISIA LONGEPEDUNCULATA*, King & Gamble, n. sp. A shrub; branchlets slender, rusty-pubescent, divaricate. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, attenuate at base; crenulate with shallow glandular crenatures, margin recurved; glabrous on both surfaces, pale beneath when dry; glandular dots many, scattered, prominent on the under surface when dry; 4 to 6 in. long, 1.25 in. broad; midrib slender; main-nerves 12 to 16 pairs, curved upwards to and along the margin usually to end in the crenature-glands; secondary nerves and reticulations obscure; petiole slender, .5 in. long, bordered by the decurrent crisped margins of the blade. *Inflorescence* a terminal

pyramidal panicle of long-peduncled racemes, 5 to 6 in. long and 6 to 9 in. broad, branches and rachis all rusty-pubescent; common peduncle about 1 in. long; branch peduncles 2 to 3 in. long, at right angles to the rachis and curved upwards; racemes about .5 in. long, about 8-flowered; pedicels slender, somewhat clavate, twisted, .5 to 1 in. long; bracteoles subulate, caducous; buds ovoid, acuminate. *Calyx-lobes* triangular, blunt, .05 in. long, rusty-pubescent; tube as long. *Corolla-lobes* pink, ovate, long acuminate, .25 in. long, rusty-pubescent within, not gland-dotted; tube very short. *Stamens* much shorter than corolla-lobes; anthers oblong, acute; filaments very short. *Ovary* rounded, style subulate, .25 in. long. *Berry* purplish-black, globose, .2 in. in diam.

PERAK: at low levels, Wray 296.

43. *ARDISIA MAINGAYI*, King & Gamble. A "bush or small tree" (Wray), "slender tree" (Scortechini); branchlets smooth, bark brown, pith rather small; innovations glandular-pubescent. *Leaves* membranous; sub-opposite or falsely whorled; elliptic-obovate or obovate-lanceolate, attenuately or abruptly acuminate at apex, attenuately cuneate at base; glabrous on both surfaces except for a few scattered glandular hairs, pale beneath; margin finely toothed except on the lower third, the teeth caudate and glandular; 6 to 11 in. long, 2 to 3.5 in. broad; midrib slender above, thickened below; main-nerves 15 to 20 pairs, irregular in angle and distance, but usually at about 50° with the midrib, straight for about half-way and then curved to and along the margin; secondary nerves and reticulations very faint; petiole none or very short, the base of the leaf almost half stem-clasping. *Inflorescence* of slender, 6 to 8 in. long, sparsely glandular-pubescent, panicles of long peduncled sub-umbellate racemes, from the axils of upper leaves, of abortive leaves, or of the scars of fallen leaves below them; common peduncle slender, 2 to 3 in. long; branch peduncles very slender, divaricate, .5 to 1.5 in. long, supported by linear subulate .2 to .3 in. long bracts; racemes .3 to .5 in. long, 8-12-flowered; bracteoles small, subulate; pedicels slender, flattened above; buds ovoid acute. *Calyx-lobes* ovate, obtuse, .05 to .1 in. long, recurved in fruit, minutely pubescent, ciliate on the margins. *Corolla-lobes* white, ovate, acute or acuminate, .15 in. long, glabrous, gland-dotted. *Stamens* much shorter than corolla-lobes; filaments short, dilated at base; anthers oblong, bluntly mucronate, .1 in. long. *Ovary* rounded, glabrous; style slender, .05 in. long. *Berry* red, .3 in. in diam., longitudinally ribbed when dry. *A. odontophylla*, Wall., var. *Maingayi*, Clarke in Hook. f. Fl. Br. Ind. III. 526.

PERAK: Wray 304, 953, 1597; Scortechini 335, 339; Curtis.

MALACCA: *Maingay* (K.D.) 1016, in the mountains about 4,500 feet and below.

Although Wray and Scortechini describe this more or less as a "tree," *Maingay*'s specimen is that of a semi-herbaceous undershrub about 24 in. high, sending out roots from above the ground-level.

44. *ARDISIA THEÆFOLIA*, King & Gamble, n. sp. A small shrub reaching 3 feet in height; branchlets brown, smooth, the uppermost parts and innovations rusty-glandular-pubescent. *Leaves* chartaceous; elliptic, long acuminate at apex, acuminate at base; alternate or sub-opposite or falsely whorled; minutely glandular-pubescent on both surfaces, scaly beneath; margins recurved, finely toothed except on the lower third and on the acumination, the teeth erect, glandular; glandular dots very numerous and prominent on both surfaces; 2 to 3 in. long, .7 to 1.2 in. broad; midrib slender; main-nerves 10 to 14 pairs, close, curved upwards to near the margin, reticulations obscure; petiole .4 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a 1.5 to 2.5 in. long panicle with short racemose branches in the axil of a leaf or of a subulate .2 in. long linear abortive leaf between the leaves on the upper part of the branches; branches .5 in. long, slender, divaricate; bracteoles minute, linear; flowers 2 to 5 in each raceme, buds ovoid. *Calyx-lobes* 5, rounded, .05 in. long, ciliate. *Corolla-lobes* 5, white, ovate, acute or obtuse, .15 in. long, gland-dotted. *Stamens* as long as corolla-lobes; filaments very short; anthers broadly oblong, mucronate. *Ovary* rounded, gradually produced in an erect or curved style, .1 in. long. *Berry* pyriform or nearly globose, .2 in. in diam., smooth, slightly ribbed when dry.

PERAK: on Ulu Batang Padang at 4,900 feet, Wray 1513; Scortechini.

45. *ARDISIA ODONTOPHYLLA*, Wall. Cat. 2279 (1829) (*not of* Lindl.); A. DC. Trans. Linn. Soc. XVII. 125, t. VI., Prod. VIII. 135; Clarke in Hook. f. Fl. Br. Ind. III. 525; Mez Monog. Myrs. 150. *A. pavonina*, Herb. Hamilt. *vide* DC. in Prod. l.c.—DISTRIB. India (Assam and Cachar).

VAR. *Lobbii*, Clarke in Hook. f. Fl. Br. Ind. III. 526. An almost herbaceous undershrub reaching to about 2 feet in height, the stems rooting from nodes near the base; bark fleshy, pale brown; pith large; upper part of stem densely fulvous-villous; leaf-buds small, short. *Leaves* membranous, sub-opposite; elliptic or elliptic-oblong or obovate-lanceolate, acute at apex, cuneate at base and sometimes slightly rounded; the margins sharply serrate except for a short distance near the base; glabrous above except on the hirsute midrib, rusty-tomentose beneath, the midrib and main-nerves usually ferruginous-



villous on the lower surface; glands scattered, not prominent; 4 to 8 in. long, 1.5 to 3.5 in. broad; midrib thick, prominent; main-nerves 8 to 12 pairs, prominent, irregular in distance and angle, curving upwards to and along the margin; secondary nerves few, reticulations transverse; petiole variable, stout, .4 to 1 in. long, ferruginous-villous, rarely glabrescent. *Inflorescence* of short (under 1 in. long) lax, few-flowered, pubescent, simple or compound, umbellate racemes, from the axils of leaves below the summit or of a linear subulate abortive leaf about .5 in. long; peduncles slender, .5 to 2 in. long; pedicels slender, .3 to .7 in. long, recurved; bracteoles short, subulate; buds ovoid. *Calyx-lobes* ovate, obtuse, ciliate, .1 in. long, slightly pubescent, marked with faint brown striæ; tube short. *Corolla-lobes* pink, ovate, obtuse or bluntly acuminate, .15 to .2 in. long, unequal, marked with many light brown linear and round glands; tube short. *Stamens* half the length of the petals; anthers broad, oblong, .1 in. thick, emarginate; filaments very stout. *Ovary* ovoid, gradually narrowed into a slender subulate style .1 in. long, the top of the ovary and base of the style short pubescent. *Berry* globose, scarlet, fleshy, .25 in. in diam., smooth.

PERAK: Wray 2285, 2975; King's Collector 2583, 2978, 3053, 7367. SELANGOR: Ridley 7560. PAHANG: Ridley 2270, 5825. SINGAPORE: Lobb 316, an undershrub of dense forests in wet localities.

Ridley's Pahang specimens have smaller leaves and longer calyx-lobes, with fewer-flowered inflorescences, the whole plant more thickly fulvous-villous, but do not seem capable of separation.

46. *ARDISIA BAMBUSETORUM*, King & Gamble, n. sp. A small semi-herbaceous shrub. 1 to 2 feet high; stem pale brown about .25 in. in diam., bark spongy, pith large. *Leaves* membranous; oblong or oblong-lanceolate or obovate-oblong, acute at apex, narrowly attenuate at base and slightly rounded; glabrous on both surfaces, slightly scaly only beneath; glands few, scattered, chiefly near the margin; margins very briefly and irregularly toothed, usually recurved; 4 to 6 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curved upwards, and often branching, to and along the margin, where they anastomose in a rough intramarginal nerve; secondary nerves few, reticulations oblique; petiole .4 to .6 in. long, channelled above. *Inflorescence* of lateral pedunculate racemes 1 to 1.5 in. long supported by a linear abortive leaf .5 in. long; peduncle .7 to .8 in. long, raceme the same; bracteoles small subulate about .1 in. long; pedicels slender, clavate, .4 to .5 in. long recurved; buds ovoid; flowers white.

*Calyx-lobes* 5, linear-oblong, acute, reflexed, .05 to .07 in. long, not gland-dotted. *Corolla-lobes* ovate-oblong, .15 in. long, dotted with elongated brown glands. *Stamens* shorter than the corolla-lobes; filaments short; anthers oblong, obtuse, emarginate, .1 in. long. *Ovary* rounded, glabrous; style slender, curved, .1 in. long. *Fruit* not seen.

PERAK: in dense bamboo forest, *King's Collector* 10095.

This is scarcely more than a var. of *A. odontophylla*, but is recognised by the somewhat different leaves, white flowers, glabrous ovary and style, and the absence of fulvous tomentum.

## 6. ANTISTROPHE, A. DC.

Slender shrubs, with puberulous branchlets. *Leaves* alternate, entire or dentate, lanceolate, acuminate, glandular, petiole margined. *Flowers* hermaphrodite, in sub-sessile axillary umbels or solitary, pedicels slender, bracts small. *Calyx* small, 5-lobed, persistent; lobes acute, imbricate. *Corolla* deeply 5-cleft; lobes lanceolate acuminate, overlapping to the left in bud. *Stamens* 5, inserted on the throat of the corolla; filaments short; anthers free, hastate-lanceolate, the connective produced upwards in a membranous tip, cells dehiscing longitudinally and introrsely. *Ovary* ovoid, attenuated in a filiform style, stigma punctiform; ovules many on a globose central placenta. *Fruit* a globose berry, pericarp coriaceous, endocarp chartaceous. *Seed* 1, albumen ruminated; embryo cylindric, transverse.—DISTRIB. Species 4, Indian and Malayan.

Inflorescence 1-2-flowered, glabrous; leaves caudate acuminate .. 1. *A. caudata*.  
 Inflorescence 4-6-flowered, hirsute; leaves short acuminate .. 2. *A. Curtisi*.

1. ANTISTROPHE CAUDATA, King & Gamble, n. sp. A shrub or small tree; branches smooth, divaricate, nearly glabrous; branchlets puberulous, with faint raised lines from the bases of the leaf-petioles; innovations rusty-pubescent. *Leaves* membranous; elliptic-lanceolate, caudate-acuminate at apex, attenuate or somewhat rounded at base; entire or undulate on the margins; glabrous on the upper, minutely puberulous or glabrous and with pale peltate scales on the lower, surface; glandular dots very many, scattered, prominent; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, conspicuous below; main-nerves 8 to 12 pairs, prominent beneath, at an angle of about 60° with the midrib, arching upwards, forking and obscurely anastomosing near the margin, the lowest pair of nerves more oblique than the rest; secondary nerves short, slender, reticulations indistinct; petiole .1 to .2 in. long, edged by the decurrent margins of the blade which are almost connivent above. *Inflorescence* of short, axillary, usually only 1-2-flowered sub-

sessile umbels, with very minute bracts; pedicels slender, clavate, .4 in. long; buds conical, long acuminate, .3 in. long, glabrous. *Calyx-lobes* ovate, acute, .05 in. long, ciliate on the edges, gland-dotted in two central lines. *Corolla-lobes* ovate, long-caudate-acuminate, .3 in. long, glabrous, dotted with few elongate glands. *Stamens* inserted at the base of the corolla-lobes and nearly as long as them (.25 in.); anthers sagittate-lanceolate with prominent rows of glands on the back, connective produced upwards in a membranous tip. *Ovary* ovoid, glabrous; style subulate, .25 in. long, very slender. *Berry* globose, .25 in. in diam., smooth, obscurely vertically striate.

PERAK: at Gunong Batu Pateh, 3,400 feet, Wray 456, 978, 3242; Curtis 3324.

This species at first sight resembles *A. oxyantha*, A. DC., of North-East India, but has smaller and differently-veined leaves, with different glands and smaller flowers.

2. *ANTISTROPHE CURTISII*, King & Gamble, n. sp. A shrub(?); branchlets round, rusty-glandular-hirsute, zigzag, with faint raised lines from the bases of the petioles of the leaves; innovations densely rusty-glandular-hirsute. *Leaves* membranous; elliptic or elliptic-oblong, acuminate at apex, rounded at base, entire; nearly glabrous above except on the midrib, sparsely rusty-hirsute beneath; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath; main-nerves about 10 pairs, at about an angle of 50° with the midrib, curved upwards, forked and broadly anastomosing near the margin, lowest pair not more oblique than the others; secondary nerves and reticulations obscure; petiole .2 in. long, crispedly channelled above. *Inflorescence* of densely rusty-hirsute, sub-sessile, axillary, 4-6-flowered, umbellate racemes, .1 to .15 in. long; bracteoles subulate, .05 in. long; pedicels slender, .3 to .5 in. long; buds caudate-acuminate, .3 in. long. *Calyx-lobes* linear subulate, .1 in. long, densely rusty-hirsute. *Corolla-lobes* ovate at base, long caudate-acuminate, .3 in. long, scarcely dotted, 3-5-nerved, sparsely hirsute without. *Stamens* rather shorter than the corolla-lobes, connivent in a cone; anthers sessile, lanceolate sagittate, the back with 2 rows of prominent round or elongate glands, the connective produced in a blunt membranous tip. *Ovary* ovoid, style slender, as long as anthers. *Berry* not seen.

PERAK: in Kuran Valley, below the gap, 4,000 feet, Curtis 3390.

#### 7. *ÆGICERAS*, Gaertn.

Sea-coast shrubs, or small trees; branches cylindric, glabrous. *Leaves* scattered, petioled, entire, glabrous, alternate. *Flowers* large

(for the Order) white, pedicellate, without bracteoles, in terminal or axillary umbels or panicles, pedicels slender. *Calyx* 5-lobed; lobes obtuse, coriaceous, twisted to the left, overlapping to the right; tube none. *Corolla* with short tube; lobes 5, acute, overlapping to the right in bud, afterwards recurved. *Stamens* 5, inserted on the corolla-tube; filaments elongate, connate into a tube below; anthers with transversely septate cells, cordate-lanceolate, introrse, dehiscent longitudinally. *Ovary* fusiform, narrowed into an elongated style; stigma acute; ovules many, immersed in a central globose placenta. *Fruit* cylindric, curved, acute, coriaceous, 1-seeded; pericarp coriaceous, afterwards splitting, testa membranous. *Seed* elongate, exalbuminous; radicle inferior, enlarged at the base, joined with the cotyledons into a cylindric tube; germination often taking place while still on the plant, as in some *Rhizophoræ*.—DISTRIB. Two species, of the sea-coasts of India, Burma, the Malay Peninsula and Islands, to South China and tropical Australia.

*ÆGICERAS MAJUS*, Gaertn. Fruct. I. 216, t. 46, fig. 1 (1788). A shrub or small tree reaching 15 to 20 feet in height, evergreen, all parts glabrous; branches greyish-black, smooth; branchlets reddish. *Leaves* coriaceous; obovate, rounded obtuse or emarginate at apex sometimes even obcordate, cuneate at base, margins recurved; glandular dots many, inconspicuous; 1.5 to 3.5 in. long, 1 to 1.5 in. broad; midrib slender, raised above or sometimes depressed; main-nerves about 10 pairs, slender, raised above, straight at first then curving upwards; secondary nerves slender, few, reticulations not prominent; petiole .2 to .3 in. long, thick, bordered by the decurrent margins of the blade. *Inflorescence* a terminal, axillary or leaf-opposed many- (15 to 20) flowered umbel, sessile or very short peduncled; bracts oblong-lanceolate, deciduous; pedicels slender, .3 to .5 in. long; buds conical. *Calyx-lobes* concave, gibbous at the base, broadest at top, .25 in. long, .15 in. broad, with parallel veins and scattered black dots in the lower part. *Corolla-lobes* ovate, acuminate, glabrous, parallel-veined, .25 in. long, recurved; tube as long as lobes, villous hairy within. *Stamens* longer than corolla-lobes, exsert; filaments connate half-way up, linear, connate part densely villous, free part glabrous .2 in. long; anthers .1 to .15 in. long, dorsifixed, cells prominently septate. *Ovary* ovoid, surmounted by a subulate angular style, .3 in. long, black-gland-dotted below. *Fruit* a long acuminate pale brown capsule, up to 3 in. long, .25 in. in diam., glabrous. *Seed* 1, elongate, filling the capsule, embryo inverse, funicle very long. Willd. Sp. Pl. I. 1185; Roem. & Schult. Syst. Veg. IV. 511; Roxb. Fl. Ind. III. 130; A. DC. in Ann. Sc. Nat. 2, XVI. t. 9A, and Prod. VIII.



142; Wight Icon. t. 146; Miq. Fl. Ind. Bat. II. 1031; Scheff. Myrs. 97; Benth. Fl. Austral. IV. 277; Dalz. & Gibs. Bomb. Fl. 137; Bedd. Fl. Sylv. CXXXIX. Anal. pl. XIX. III.; Clarke in Hook. f. Fl. Br. Ind. III. 533; Trimen Fl. Ceyl. III. 74; Cooke Fl. Bomb. II. 88; Koord. & Val. Bijdr. V. 276; Pax in Engl. & Prantl Pflanzenfam. IV. i. 97, fig. 57; Schimp. Strandfl. 44, figs. 1, 2; Prain Beng. Pl. 645. *Æ. fragrans*, Koenig Ann. of Bot. I. 129, t. 3; Wall. Cat. 2326; Wight in Hook. Bot. Misc. III. 84, t. 21. *Æ. minus*, A. DC. l.c. 142. *Æ. Malaspinæa*, DC. l.c. 143. *Æ. obovatum*, Blume Bijdr. 693. *Æ. corniculatum*, Blanco Fl. Filip. 79; Kurz in Journ. As. Soc. Beng. XLVI. II. 227 and For. Fl. III. 114; Mez Monog. Myrs. 55, fig. 8. *Rhizophora corniculata*, Linn. Sp. Pl. Ed. 3 (1764), 635. "*Pou-Kandel*," Rheede Hort. Mal. VI. 36. *Mangium fruticosum corniculatum*, Rumph. Herb. Amb. III. 117.

PENANG: Wallich 2326; Curtis 52, 513. PERAK: King's Collector 4961. MALACCA: Maingay (K.D.) 1017; Griffith (K.D.) 3538. SINGAPORE: Ridley 2801A, 3632A.—DISTRIB. Sea-coast of India from Sind to Ceylon, the Sundarbans, Burma, and the Andaman Islands; eastwards to the Malay Islands, South China, the Philippines and Australia. One of the coast plants included under the general name of "Mangroves."

## Order LXXI. SAPOTACEÆ.

Trees or shrubs, with milky juice, generally evergreen, young parts often rusty-tomentose. *Leaves* alternate, rarely sub-opposite, coriaceous or rarely membranous, entire, penniveined; stipules none or very caducous. *Flowers* usually hermaphrodite, small or medium-sized, solitary or fascicled in the axils of the leaves, sometimes (*Sarcosperma*) paniculate; bracts and bracteoles very small or wanting. *Calyx* inferior, persistent or deciduous; lobes 4 to 8, much imbricate, occasionally biseriate with the outer ones valvate. *Corolla* gamopetalous; tube short, campanulate or urceolate; lobes as many as, or 2 to 4 times as many as, those of the calyx. *Stamens* inserted on the corolla-tube in 1 to 2 series and opposite to them, sometimes alternating with staminodes; filaments short, erect; anthers ovate-lanceolate or linear-sagittate, 2-celled, the connective sometimes produced. *Disk*, hypogynous, often inconspicuous or wanting. *Ovary* superior, sessile, often villous, 2-5- or more celled; style shortly conical or elongate-subulate, glabrous; stigma terminal, punctiform; ovules solitary in the cells, attached to the inner angle. *Fruit* an indehiscent, 1-8-seeded berry, pericarp usually fleshy. *Seeds*, if solitary, conform to

the fruit; if more than one compressed, ellipsoid; hilum conspicuous; testa usually crustaceous, shining; embryo straight, exalbuminous with fleshy cotyledons, or albuminous with flat cotyledons; radicle inferior, usually small.—**DISTRIB.** About 320 species, in the tropical regions of the whole world, genera about 24.

Calyx-lobes 1-seriate, imbricate; stamens 5 to 6:—

Staminodes none .. .. . 1. *CHRYSOPHYLLUM*.

Staminodes present:—

Flowers sessile or in panicles .. .. . 2. *SARCOSPERMA*.

Flowers in axillary fascicles .. .. . 3. *SIDEROXYLON*.

Calyx-lobes 2-seriate, outer series valvate:—

Calyx segments 4:—

Seeds albuminous:—

Stamens 8 .. .. . 4. *ISONANDRA*.

Stamens 12 or more .. .. . 5. *PAYENA*.

Seeds exalbuminous, stamens 12 or more .. .. . 6. *BASSIA*.

Calyx segments 6 to 8:—

Staminodes none, seeds exalbuminous .. .. . 7. *PALAQIUM*.

Staminodes present, seeds albuminous .. .. . 8. *MIMUSOPS*.

# 1. *CHRYSOPHYLLUM*, Linn.

Trees with milky juice. *Leaves* coriaceous, glabrous or pubescent on the under-surface, main-nerves usually very many, thin; stipules none. *Flowers* small, in axillary fascicles, usually hermaphrodite. *Calyx* 5-7-lobed; lobes subequal, imbricate. *Corolla* tubular-campulate or sub-rotate, 5-7-lobed; lobes imbricate, entire. *Stamens* equal in number with, and opposite to, the corolla-lobes, attached to the tube or the base of the lobes; filaments subulate or filiform; anthers ovate or triangular, extrorse or laterally dehiscent; staminodes none. *Ovary* villous, 5-, rarely 6-7-celled, style glabrous; ovules one in each cell, attached to the central placenta. *Fruit* a fleshy or coriaceous berry, globose, 5-celled or less by abortion. *Seeds* large; testa very hard, dull or shining; hilum conspicuous; embryo as large as the seed, erect, cotyledons flat in fleshy albumen, radicle inferior.—**DISTRIB.** About 60 species, chiefly tropical American, a few only in Asia, Africa and Australia.

*CHRYSOPHYLLUM ROXBURGHII*, G. Don Gen. Syst. IV. 33 (1837). A slender, erect tree reaching 40 to 60 ft. in height, evergreen; branches horizontal; bark smooth, grey; young branchlets and innovations ferruginous-pubescent. *Leaves* coriaceous, glabrous, alternate; oblong-lanceolate, suddenly caudate-acuminate at the apex which is sometimes obtuse, cuneate at base and unequal, undulate on the margins; 3 to 6 in. long, 1.25-2 in. broad; midrib slender, prominent

beneath; main-nerves very numerous, parallel, nearly at right angles to midrib, meeting in an intramarginal nerve; secondary nerves similar, reticulations slanting; petiole thick, .25 in. long, pubescent. *Flowers* small, in rounded axillary fascicles; pedicels slender, .1 to .2 in. long, ferruginous-pubescent. *Calyx-lobes* 5, ovate, glabrous or pubescent outside, thick, ciliate on the margins, .07 to .1 in. long; tube short. *Corolla* tubular-campanulate, .1 in. long; lobes 5, short, ciliate on the margins. *Stamens* 5, shorter than the corolla, opposite the corolla-lobes and inserted on the base of the tube; filaments slender; anthers ovate, apiculate and ending in a minute tuft of hairs, extrorse, slits somewhat lateral. *Ovary* rounded, obscurely 5-lobed, surrounded by a thick tuft of long ferruginous hairs; style thick, cylindro-conical, glabrous; cells 5. *Fruit* a globose or obscurely 5-lobed berry 1 to 1.5 in. in diam., strongly 5-lobed when dry, ferruginous-tomentose when young afterwards smooth, yellowish-green, with thick glutinous pulp. *Seeds* .6 in. long, .5 in. broad, flattened, the outer edge curved, the inner nearly straight; hilum oblong, conspicuous, pale; testa very hard, thick, shining, chestnut-brown; embryo erect, cotyledons flat, .4 in. broad, ovate, obtuse, 3-nerved; radicle large, cylindric. A. DC. Prod. VIII. 162; Clarke in Hook. f. Fl. Br. Ind. III. 535; Bedd. Fl. Sylv. t. 236; Kurz For. Fl. II. 118 and in Journ. As. Soc. Beng. XLVI. ii. (1877) 228; Trimen Fl. Ceyl. III. 76; Dalz. & Gibs. Bomb. Fl. 138; Cooke Bomb. Fl. II. 88; Burck Ann. Gard. Buit. V. i. (1886), 4; Koord. & Val. Bijdr. I. 130. *C. acuminatum*, Roxb. Fl. Ind. I. 599; Wall. Cat. 4160 (not of Lamk.). *C. lanceolatum*, A. DC. l.c.; Miq. Fl. Ind. Bat. II. 1035. *C. javanicum*, Steud. Nom. Ed. II: i. 359. *Nycteristition lanceolatum*, Bl. Bijdr. 676.

MALACCA: Griffith (K.D.) 3600; Maingay (K.D.) 980; Goodenough 1739. SINGAPORE: Ridley 2756, 5837.—DISTRIB. British India; Burma; Java; Sumatra.

Curtis No. 1072, collected at Batu Ferengy, Penang, and now in the Kew Herbarium, seems to be a new species of *Chrysophyllum*. The leaves are chartaceous, lanceolate, acuminate at both ends, glabrous, shining, 2 to 4 in. long, .75 to 1 in. broad, the veins indistinct. *Flowers* unknown. *Fruit* a fleshy berry, .5 in. in diam., 5-lobed when dry, glabrous. *Seeds* .4 in. long, .25 in. broad, rounded on the outside, narrowed and somewhat concave within; testa hard, dark chestnut-brown, shining; hilum narrow. It might be called *C. Curtisii*, n. sp., King & Gamble.

## 2. SARCOSPERMA, Hook. f.

Glabrous trees. *Leaves* coriaceous or chartaceous, opposite and alternate, oblong; stipules caducous. *Flowers* small, sessile or fascicled

on the branches of a simple or compound panicle, sessile or shortly pedicellate; bracteoles minute. *Calyx-lobes* 5, rounded, sub-equal, much imbricate. *Corolla* broadly campanulate; tube short; lobes 5, rounded, entire, much imbricate. *Stamens* 5, inserted on the tube of the corolla and opposite to its lobes; filaments very short; anthers obtuse, laterally or extrorsely dehiscent. *Staminodes* 5, small, subulate or rounded. *Ovary* glabrous, 1-2-celled; style short; stigma somewhat lobed, capitate. *Fruit* an ellipsoid berry, 1-2-seeded; pericarp coriaceous, scarcely thick. *Seeds* 1-2; testa crustaceous; hilum nearly basal; albumen none; embryo fleshy.—*DISTRIB.* Species 3, in North-East India, Burma, Malaya and S. China.

*SARCOSPERMA PANICULATUM*, Stapf & King in Hook. f. Ic. Plant. t. 2690 (1901). A tree, reaching 50 to 70 feet in height and 18 to 20 in. in diam.; branchlets thick, dark brown, glabrous. *Leaves* chartaceous; sub-opposite, elliptic-oblong, bluntly acuminate at apex, acute or rounded or often rhomboid at base; glabrous on both surfaces, nearly black when dry; 4 to 8.5 in. long, 1.5 to 3 in. broad; midrib slender; main-nerves 7-8 pairs, slender, distant, often nearly 1 in. apart, starting at an angle of about 60° with the midrib and at once curving upwards to and along the margin; secondary nerves many and, like the transverse reticulations, inconspicuous; glandular pits in the axils of most of the main-nerves; petiole .5 to .7 in. long, channelled above and with two minute rounded auricles below the blade. *Flowers* solitary or clustered on the branches of a leafy compound panicle of racemes, the racemes often 2 in. long; bracteoles minute, triangular; pedicels rarely reaching .05 in. in length, stout; buds globose. *Calyx-lobes* 5, imbricate, rounded, usually 3 larger with somewhat scarious margins, 2 smaller thicker and slightly acute, shortly campanulate. *Corolla-lobes* 5, closely imbricate, rounded, glabrous, .05 in. long, the margins revolute; tube as long as lobes. *Stamens* 5, inserted on the top of the tube; filaments very short; anthers ovate, rounded, introrse, or laterally dehiscent. *Staminodes* alternating with the stamens, minute, nearly orbicular, crenulate. *Ovary* conical, furrowed; style very short; thick, stigma capitate, minutely 2-4-lobed. *Fruit* drupaceous, ellipsoid, seeds, 1-2. *Bractea paniculata*, King in Journ. As. Soc. Beng. LXIV. ii. 101.

*PERAK*: *Scortechini*; *King's Collector* 7970, 8086, 10284, 10554, 10672, 10835; among large bamboos, on river-banks, or in mixed forest.

### 3. *SIDEROXYLON*, Linn.

Trees or shrubs, sometimes armed, with milky juice. *Leaves* coriaceous or thinner, entire, alternate; stipules none. *Flowers*



small, in fascicles in the axils of the leaves or of the scars of fallen leaves, sub-sessile or shortly pedicelled. *Calyx* of 5-6 imbricate, usually orbicular and obtuse segments. *Corolla* campanulate, or tubular-campanulate, with 5 or rarely 6 lobes, the lobes imbricate. *Stamens* as many as the corolla-lobes and opposite to them, attached to the tube or at its base; filaments linear, usually short; anthers ovate or lanceolate; staminodes alternating with the stamens, lanceolate. *Ovary* usually villous, with 5 or fewer cells; style cylindric; stigma small; ovules erect, placentas axile. *Fruit* an ovoid or globose fleshy berry, 5- or less-seeded, usually with one seed only. *Seeds* compressed, generally solitary; testa hard, crustaceous, usually shining; hilum oblong or linear; embryo erect, cotyledons flat or thickened, in fleshy albumen; radicle short, inferior.—*DISTRIB.* About 60 species, mostly of tropical regions in both hemispheres, a few only extratropical in South Africa or Australasia.

Leaves more than 3 in. broad, yellowish when dry, main-nerves

very prominent .. .. . 1. *S. malaccense*.

Leaves under 3 in. broad, green or brown when dry:—

Leaves nearly glabrous, membranous, obovate-acuminate .. 2. *S. Maingayi*.

Leaves pubescent beneath, at least on the nerves:—

Corolla-tube longer than the lobes; leaves elliptic, grey-silky beneath .. .. . 3. *S. Derryanum*.

Corolla-tube shorter than the lobes:—

Leaves obovate, main-nerves not very prominent or regular .. .. . 4. *S. ferrugineum*.

Leaves oblong-lanceolate, main-nerves very prominent and regular .. .. . 5. *S. firmum*.

SPECIES IMPERFECTLY KNOWN: 6. *S. Wallichianum*.

1. *SIDEROXYLON MALACCENSE*, Clarke in Hook. f. Fl. Br. Ind. III. 537 (1882). A large tree, reaching 40 to 60 feet in height; branches pale brown; ultimate branchlets ferruginous-pubescent, as are the leaf-buds and young leaves. *Leaves* coriaceous; often, not always, crowded towards the ends of the branchlets; obovate-oblong, rounded or shortly acute at apex, somewhat cuneate at base; deep-green above, pale bluish-green beneath, yellow when dry, densely rusty-pubescent beneath when young, glabrous on both surfaces when old except for rusty hairs on the midrib and main-nerves beneath; 6 to 8 in. long, 3 to 4.5 in. broad; midrib very thick and prominent; main-nerves 8-14 pairs, very prominent, starting at about an angle of 60° with the midrib, parallel at first, ultimately arched upwards; reticulations not prominent, obliquely joining the main-nerves; petiole 1 to 1.5 in. long, thick, enlarged at base, bordered above by the slightly decurrent margins of the blade. *Flowers* fasciculate, shortly pedicelled, in the axils of the leaves, above

the scars of fallen leaves or on the year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, rusty-tomentose. *Calyx-lobes* 5, imbricate, .15 to .2 in. long, densely rusty-pubescent without, rounded. *Corolla* tubular-campanulate, .15 in. long, absent in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* attached to the base of the corolla-tube; anthers ovate, apiculate, opening by side-slits; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top, obscurely 5-lobed, 5-celled; style cylindric. *Berry* fleshy, somewhat oblong, rounded, tipped with the persistent style, thickly covered with velvety orange-red tomentum and about .5 in. in diam. *Seeds* not accurately known.

PENANG: *Curtis* 1452. PERAK: *Wray* 136; *King's Collector* 6550. MALACCA: *Maingay* (K.D.) 994; *Holmberg* 704. SINGAPORE: *Ridley* 6130, 6499; *Cantley* 89.

Mr. Cantley says that this tree gives the true "Daru-daru" or "Dedaru" wood of the Malay Peninsula.

2. *SIDEROXYLON MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 536 (1882). A tree with rusty-pubescent branchlets and young shoots. *Leaves* membranous; crowded towards the ends of the branchlets; obovate, shortly acuminate at apex, cuneate at base; rusty-pubescent when young, glabrous when old or rusty-pubescent on the midrib and main-nerves; 4 to 8 in. long, 1.5 to 3 in. broad; midrib prominent; main-nerves 8 to 11 pairs, starting at an angle of nearly 60° to the midrib, at first parallel then arching upwards to near the margin; transverse reticulations more or less parallel; petiole 1 to 1.5 in. long, bordered by the decurrent margins of the blade. *Flowers* fasciculate, sessile or with very short pedicels, chiefly on the previous year's wood below the leaves and shoots of the year. *Calyx-lobes* 5, imbricate, rounded, rusty-pubescent without, .075 to .1 in. in diam. *Corolla* tubular-campanulate, as long as or rather shorter than the calyx, wanting in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* short; filaments slender; anthers ovate; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top; style cylindric. *Berry* fleshy, 1.5 in. in diam., ovoid or globular, full of guttapercha. *Seeds* 4, compressed, .7 in. long by .3 to .35 in. broad; rounded outside, nearly straight within, the long narrow oblong hilum covering nearly the whole margin; testa hard, shining, dark chestnut-brown; albumen firm, white; cotyledons plane, appressed, elliptic; radicle inferior.

NEGRI SEMBILAN: *Ridley* 10084. MALACCA: *Maingay* (K.D.) 993; *Hervey*. SINGAPORE: *Ridley* 8928, 9223.

The fruit description is chiefly taken from Maingay's notes in the Kew Herbarium.

3. *SIDEROXYLON DERRYANUM*, King & Gamble, n. sp. A tree; branchlets grey, uppermost appressed-pubescent; innovations with nearly black hairs. *Leaves* chartaceous; elliptic, very abruptly short-acuminate at apex, broadly cuneate at base; margins more or less recurved; glabrous above, densely silvery-pubescent beneath; 3 to 5·5 in. long, 1·5 to 3 in. broad; midrib prominent, impressed above; main-nerves 12 to 18 pairs, parallel, starting at an angle of about 75° with the midrib, meeting near the margin in a faint intramarginal looped nerve; secondary nerves similar, rather prominent, reticulations few, obscure; petiole ·3 to ·5 in. long, channelled above, pubescent with nearly black hairs. *Flowers* fascicled, about 5 together in the axils of the leaves or of the scars of fallen leaves; pedicels ·25 in. long, tawny-pubescent; buds oblong, conical. *Calyx-lobes* 5, rounded, obtuse, the 2 outer thick very pubescent, the 3 inner somewhat scarious, pubescent only on the middle of the back. *Corolla* campanulate, ·2 in. long; tube ·15 in. long, glabrous within, with a few sparse hairs without; lobes 5, ovate, imbricate, margins recurved. *Stamens* 5, short, inserted at the top of the tube; filaments conical; anthers ovate-cordate, dehiscing by side-slits; staminodes subulate, glabrous. *Ovary* villous, obscurely 5-lobed, 5-celled; style very short; stigma obscurely 5-lobed. *Berry* oblong, dark blue, glabrous, the top flat and crowned with the remains of the style, ·6–7 in. long, 1-seeded. *Seed* oblong, ·6 in. long by ·3 in. in diam. truncate obliquely at the base; testa thick, light-brown, striate; hilum rather small, sub-basal; albumen thin; cotyledons thick; radicle small.

PERAK: *Derry-Curtis* 3641.

The colour of the silvery under-surface of the leaves is difficult to describe—it is sometimes dark and smoky-looking.

4. *SIDEROXYLON FERRUGINEUM*, Hook. & Arn. Bot. Beech. Voy. 266, t. 55 (1841). A small tree; branches rough, ultimate branchlets ferruginous-pubescent like the leaf-buds and young leaves, branchlets with a raised line downwards from each leaf or scar of a fallen leaf. *Leaves* coriaceous; obovate or oblong-lanceolate, rounded or bluntly acute at apex, attenuate at base; shining above, densely appressed ferruginous-silky beneath when young, ultimately nearly glabrous; 2·5 to 6 in. long, 1 to 3 in. broad; midrib prominent; main-nerves 10 to 12 pairs, fairly prominent, especially above, starting at about an angle of 60° with the midrib, at first nearly parallel then arching upwards to meet near the margin; secondary nerves similar, reticulations oblique; petiole ·5 to ·7 in. long, the edges bordered by the decurrent margins of the blade, enlarged at base. *Flowers* fasciculate, shortly pedicelled, in the axils of

the leaves or above the scars of fallen leaves on year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, covered like the obtuse buds with rusty tomentum. *Calyx-lobes* round, .025 to .075 in. in diam., with scarious margins, closely imbricate, rusty-pubescent outside. *Corolla* campanulate, .1 in. long; tube short; lobes 5, imbricate, rounded, crenulate, sparingly pubescent near the base within, in ♀ flowers wanting or deciduous. *Stamens* very short, attached to the corolla-tube above the base; filaments linear; anthers rounded, opening by marginal slits; staminodes subulate or somewhat hastate, acuminate. *Ovary* depressed, obscurely 5-lobed, pubescent; stigma short, cylindric, with 5 minute punctiform styles. *Berry* ovoid, shining .35 by .3 in., 1-2-seeded. *Seeds* ovoid, .25 by .15 in.; testa shining, dark brown, thick; hilum large, oblong; albumen thick; cotyledons flat. A. DC. Prod. VIII. 178; Clarke in Hook. fil. Fl. Br. Ind. III. 537. *S. attenuatum*, A. DC. l.c.; Wight Ic. t. 1590; Kurz For. Fl. II. 117, and in Journ. As. Soc. Beng. XLVI. ii. (1877) 229. *Mimusops*? *attenuata*, Wall. Cat. 4150.

KEDAH: Langkawi, *Curtis*. PENANG: *Curtis* 273, 703, 704. PERAK: *Scortechini* 1463; *King's Collector* 1224. MALACCA: *Maingay* (K.D.) 982; *Griffith* (K.D.) 3604; *Goodenough* 1735. SINGAPORE: *Wallich* 4150; *Lobb* 319; *Ridley* 5643, 5908. A sea-shore tree, found also by Ridley on Tioman Island and at Kwala Pahang (Trans. Linn. Soc. Ser. 2. III. 317).—DISTRIB. Burma, Andaman Islands, Nicobar Islands, Malay Archipelago to the Philippines and S. China.

5. *SIDEROXYLON FIRMUM*, Pierre; Burek in Ann. Jard. Buit. V. 17, tab. III. (1885). A small tree; branchlets thick, striate, brown; innovations ferruginous-pubescent. *Leaves* coriaceous; oblong-lanceolate, shortly acuminate at apex, narrowly acute at base; glabrous above, rusty-pubescent on the nerves beneath and on young leaves; margins recurved; 4 to 5 in. long, 1 to 1.5 in. broad; midrib strong, prominent, impressed above; main-nerves 12 to 16 pairs, very prominent, about .2 to .3 in. apart, starting at an angle of about 40° with the midrib, parallel, curved near and along the margin; reticulations transverse, very regular and prominent; petiole 1 to 1.5 in. long, channelled above and bordered by the decurrent margins of the blade, rusty-pubescent. *Flowers* fascicled, 4 to 6 together in the axils of the leaves; pedicels variable, .3 to .6 in. long, rusty-pubescent, slender in flower, thickened in fruit. *Calyx-lobes* 5, rounded, imbricate, .15 in. long, densely rusty-pubescent, 3 outer thick, 2 inner more or less scarious on the margins. *Corolla* campanulate, .15 in. long, 5-lobed, glabrous within, slightly hairy without; tube rather short; lobes oblong, rounded. *Stamens* inserted on the top of the tube; filaments glabrous; anthers ovate-apiculate;



staminodes subulate, about .05 in. long. *Ovary* villous; style clavate, glabrous. *Fruit* an oblong or somewhat obovoid berry, depressed at apex, glabrous, fleshy, supported by the somewhat enlarged persistent calyx-lobes, seed usually 1. *Seed* oblong, obtuse above, somewhat pointed below, little compressed, .6 in. long, .25 in. broad and thick; testa chestnut-brown, shining, crustaceous; hilum linear, flat, occupying nearly the whole inner face of the seed; albumen thick; cotyledons leafy, flat, oblong, 3-nerved; radicle inferior, pointed. *Chrysophyllum firmum*, Miq. Fl. Ind. Bat. Suppl. 579.

PENANG: at West Hill, *Curtis*, 1575.—DISTRIB. Bangka, *Teysmann*; Philippines.

The Bangka specimens have the leaves up to 2.5 in. broad, but in other respects we find no difference from *Teysmann's* type in the Penang plant.

#### SPECIES IMPERFECTLY KNOWN.

6. *SIDEROXYLON WALLICHIANUM*, G. Don Gen. Syst. IV. 28 (1837). A tree (?); branchlets pale brown, ferruginous-villous as are the innovations. *Leaves* chartaceous; elliptic-obovate, obliquely acuminate at apex, cuneate at base, crowded towards the ends of the branchlets; 6 to 8 in. long, 3 to 4 in. broad; midrib thick; main-nerves 6 to 7 pairs, curved upwards, distant, reticulations prominent; petiole thick, densely tawny-pubescent. *Calyx-lobes* apparently 5, short, rounded, rusty-pubescent. Miq. Fl. Ind. Bat. II. 1037. *S. (?) rugosum*, Wall. Cat. 4158.

The only sheet of this is in the type Herbarium of Wallich's plants with the Linnean Society of London. The remains of flowers are very slight, but they seem to show that the plant belongs to this genus. The note "a small plant growing on rocks—flowers white—from the hills" attached to the sheet, seems to refer to some other plant, for the specimen itself has every appearance of having come from a tree.

#### 4. *ISONANDRA*, Wight.

Trees with milky juice. *Leaves* coriaceous, entire, alternate, penniveined, the main-nerves and midrib prominent, the rest usually rather obscure. *Flowers* small, in axillary shortly pedicellate clusters in the axils of present or fallen leaves. *Calyx* of 4 segments, the two outer opposite, more or less valvate; the two inner also opposite, imbricate. *Corolla* tubular, campanulate; lobes 4, much imbricate, somewhat twisted. *Stamens* 8, sub-equal, attached near the base of the corolla, both opposite to and alternate with the lobes; filaments short; anthers lanceolate, sagittate at base, extrorse; staminodes absent. *Ovary* 4-celled, villous; style linear. *Berry* somewhat small, ovoid or oblong with a fleshy pericarp. *Seed* usually 1 only, scarcely flattened; testa thick, shining, crustaceous; hilum

lateral, long; albumen fleshy, cotyledons flat, radicle inferior.—DISTRIB. About 7 species, 6 of which in South India and Ceylon.

1. *ISONANDRA PERAKENSIS*, King & Gamble, n. sp. A small tree reaching 30 to 40 feet in height; ultimate branchlets, leaf-buds and young leaves appressed greyish-brown-pubescent. *Leaves* coriaceous; obovate-oblong, rounded at the apex, cuneate sometimes unequally at the base; the margins reflexed, glabrous and dull above, thickly brown-pubescent beneath; 2 to 3.5 in. long, 1 to 1.5 in. broad; midrib prominent; main-nerves 8 to 10 pairs at about 60° with the midrib, reticulations very inconspicuous; petiole .2 to .3 in. long, rather stout. *Flowers* fasciculate, on very short, .1 in. long, thick, angular pedicels in the axils of upper leaves; buds .15 in. long, obtuse, brown-appressed-pubescent. *Calyx* of 4 lobes, an outer pair and an inner pair, the outer valvate, the inner shining within, minutely ciliate; lobes .15 in. long. *Corolla* 4-lobed; lobes rounded, about equal to the tube, together about equal to the calyx. *Stamens* 8, filaments thickened; anthers lanceolate, sagittate at base, extrorse. *Ovary* slightly hairy, conical, surmounted by a short linear style as long as the calyx; cells 4. *Berry* oblong, acute, smooth, .4 to .5 in. long. *Seeds* ellipsoid, acute at apex, scarcely flattened, .35 by .15 in.; hilum large, oblong; testa dark brown, hard, smooth, shining; albumen fleshy; embryo large, cotyledons oblong.

PERAK: at 1,000 to 1,500 feet elevation, *King's Collector* 7138.

#### DOUBTFUL SPECIES.

2. *ISONANDRA RUFA*, King & Gamble, n. sp. A small tree, reaching 20 to 30 feet in height and 4 to 6 in. in diam.; younger branchlets and innovations densely ferruginous pubescent. *Leaves* membranous; obovate, long acuminate sometimes abruptly at apex, cuneate and finally more or less rounded at base; sparsely pubescent above when young, nearly glabrous when old; roughly pubescent beneath, especially on the nerves; 5 to 7 in. long, 1.5 to 2.5 in. broad; midrib prominent; main-nerves 8 to 10 pairs, irregularly distanced, at first at an angle of about 45° with the midrib, then arching upwards; secondary nerves and reticulations prominent; petiole .3 in. long, slender, rusty-pubescent, channelled above; stipules very short, subulate, rusty-pubescent, very caducous. *Flowers* solitary or in pairs in the axils of the upper leaves or on the upper branchlets, very small; pedicels slender, .25 in. long, recurved. *Calyx-lobes* 4, densely ferruginous-pubescent; 2 outer valvate, ovate, .2 in. long; 2 inner imbricate, ovate, somewhat scarious and ciliate on the margins. *Corolla* tubular-campanulate; .2 to .25 in. long; tube slender, minutely

hairy without and near the mouth within; lobes 6 (?), linear oblong, .1 in. long, erect. *Stamens* 6 (?), .1 in. long; filaments very slender, villous; anthers ovate, penicillate-apiculate. *Ovary* rounded, glabrous; style slender, curved, .2 in. long. *Fruit* an oblong berry, about 1 in. long and .5 in. broad. *Seed* 1, testa thin, shining.

PERAK: *Scortechini* 159; *King's Collector* 4550, in dense jungle at 500 to 800 feet.

In only one flower were any traces found of the corolla and stamens, and there seemed to be 6 corolla-lobes instead of 4, and 6 stamens instead of 8. We consider it best, however, to leave the species here for the present and until better material is available.

### 5. PAYENA, A. DC.

Trees with milky juice. *Leaves* membranous or chartaceous, often silky beneath; stipules caducous. *Flowers* fascicled, rather few together, in the axils of the leaves on the upper part of the branchlets, pedicellate. *Calyx-lobes* 4, the 2 outer usually valvate enclosing the 2 inner generally imbricate. *Corolla* campanulate; tube broad, short; lobes 8, imbricate, in one or two series. *Stamens* 16, inserted on the corolla-tube; filaments short; anthers usually extrorse, ovate to linear, connective produced in an acumen; staminodes none. *Ovary* villous, usually 8-celled; style linear-subulate. *Fruit* an oblong or ovoid fleshy berry, few-seeded. *Seeds* oblong, usually somewhat compressed; testa crustaceous, shining; hilum oblong or linear, conspicuous; albumen thin; cotyledons leafy, thin, flat, nearly as long and broad as the cavity of the seed; radicle inferior, generally rather conspicuous.—*DISTRIB.* About 6 to 7 species, found in the Malay Peninsula and Archipelago.

Flowers large, reaching .75 in. in length:—

- |  |                                   |
|--|-----------------------------------|
| Leaves 6 to 9 in. long, silky-pubescent beneath..    | .. 1. <i>P. Maingayi.</i>         |
| Leaves 4 to 5 in. long, glabrous on both surfaces .. | .. 2. <i>P. longipedicellata.</i> |

Flowers medium-sized or small, under .75 in. in length:—

Flowers in fascicles near the ends of the branchlets, having the appearance of a terminal inflorescence:—

- |  |                            |
|--|----------------------------|
| Flowers moderate-sized, berry obpyriform, acuminate at tip .. .. . | .. 3. <i>P. Havilandi.</i> |
| Flowers small, berry oblong conical, truncate at tip ..            | .. 4. <i>P. Leerii.</i>    |

Flowers in fascicles in the axils of the leaves, never apparently terminal:—

- |  |                             |
|--|-----------------------------|
| Leaves glabrous, pedicels slender, flowers small ..                        | .. 5. <i>P. lucida.</i>     |
| Leaves ferruginous-pubescent, pedicels short, flowers rather large .. .. . | .. 6. <i>P. dasyphylla.</i> |

### SPECIES IMPERFECTLY KNOWN.

- |                        |                           |
|------------------------|---------------------------|
| Leaves sessile .. .. . | .. 7. <i>P. sessilis.</i> |
|------------------------|---------------------------|

Leaves petiolate :—

Leaves under 4 in. long, obovate or elliptic-obovate, more or

less obtuse .. .. . 8. *P. obtusifolia*.

Leaves over 4 in. long, oblong-lanceolate, acuminate .. 9. *P. selangorica*.

1. *PAYENA MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 547 (1882). A large guttapercha-yielding tree, reaching 80 feet in height and a considerable girth; branchlets dark brown, smooth, younger branchlets and innovations rusty-tomentose; leaf-buds golden pubescent, scales .2 to .3 in. long, lanceolate. *Leaves* chartaceous; oblong, acuminate at the apex sometimes caudately sometimes abruptly, cuneate at the base; glabrous above except on the midrib, covered beneath with a silky golden-brown pubescence, afterwards glabrate; 6 to 9 in. long, 2 to 3 in. broad; midrib prominent, minutely pubescent above or glabrous; main-nerves 20 to 25 pairs, .3 to .5 in. apart, starting at an angle of about 70° with the midrib, at first parallel, ultimately ending in a looped intramarginal nerve; secondary nerves between the main-nerves, obscure like the reticulations; petiole 1 in. long, bordered above by the decurrent margins of the blade; stipules linear, subulate, .3 in. long, golden-pubescent, quickly caducous. *Flowers* fascicled, 2 to 6 together in the axils of the leaves; pedicels slender, .75 in. long, up to 1 in. in fruit and then thickened, clavate, brown-pubescent. *Calyx*-lobes 4, .4 to .5 in. long, densely brown-pubescent outside; outer pair valvate, ovate-acute, thick; inner pair imbricate, concave, keeled, acuminate, rather thin. *Corolla* white, campanulate, .6 to .8 in. long, glabrous; tube about .2 in. long; lobes 8, lanceolate, in 2 rows, the outer 4 enclosing the inner 4. *Stamens* 16, inserted on the top of the tube, .25 in. long; filaments thick; anthers as long as filaments, ovate, extrorse, crowned by a long mucro formed by the produced connective, the mucro ciliate or truncate or bifid at the apex. *Ovary* ovoid, pubescent, tapering into a subulate .8 in. long style, cells 8. *Fruit* an oblong, golden-pubescent or nearly glabrous berry up to 1.5 in. long by .8 in. broad, crowned by the remains of the persistent style, and supported by the persistent calyx-lobes, seeds 1 to 2. *Seeds* oblong, convex on one side, somewhat concave on the other, 1 to 2 in. long by .5 in. broad and .2 in. thick; testa light brown, shining, crustaceous; hilum conspicuous, slender; albumen thin; cotyledons oblong rounded, .8 in. long by .225 in. broad; radicle rather large, inferior. Pierre in Bull. Linn. Soc. Par. I. 526. *Chrysophyllum* ? *molle*, Wall. Cat. 4161.

PENANG: *Curtis* 1565. PERAK: *Scortechini* 172, 346; *Wray* 3423; *King's Collector* 7223, 7918; in open jungle or rich soil from 300 up to 2,000 feet. MALACCA: *Griffith* (K.D.) 3610; *Maingay* (K.D.)



990; Curtis 3483. SINGAPORE: Ridley 6239, 6497. Curtis says it is the "Taban Percha" of the Malays.

The drawing of the flower in Engl. & Prantl Naturl. Pflanzen-Fam. IV. i. 132, fig. 69 A-C seems a little doubtful. The identification of Wall. Cat. 4161 seems also doubtful, for *Payena Maingayi* much resembles in leaf *Palaquium Gutta* var. *oblongifolia*.

2. *PAYENA LONGIPEDICELLATA*, Brace MS. in Herb. Calc. A tree, reaching 100 to 130 feet in height; branches slender, silvery-grey, innovations rusty-pubescent. *Leaves* chartaceo-coriaceous; oblong or elliptic-oblong, shortly acuminate at apex, rounded unequally at the base; glabrous on both surfaces, margins slightly recurved; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above; main-nerves about 18 pairs, indistinct, starting at about  $85^{\circ}$  with the midrib, at first parallel, near the margin joined in an intramarginal looped nerve; secondary nerves nearly as prominent as main-nerves, often branching backwards, reticulations few, indistinct; petiole .7 to .8 in. long, channelled above and bordered by the margins of the decurrent blade; stipules small, ovate-acute, rusty-pubescent, very caducous. *Flowers* fascicled, 1-3 together, in the axils of lower leaves or of the scars of fallen leaves; pedicels 1 to 1.5 in. long, slender, curved, striate when dry, clavate above, puberulous; flower-buds conical, large. *Calyx-lobes* 4; 2 outer valvate, ovate-acute, thick, .5 in. long, sparsely rusty-pubescent; 2 inner lanceolate-acuminate, concave, thickly keeled, .6 in. long, densely tawny-pubescent on the back. *Corolla* tubular-campanulate, .8 in. long; tube .3 in. long, glabrous; lobes 8, 4 outer enclosing 4 inner, ovate-acuminate, glabrous. *Stamens* 16, inserted in 1 row, below the top of the tube but alternate ones covered by the others; filaments very short, slender; anthers .15 in. long, ovate, rusty-hirsute, extrorse, the connective produced in a broad mucro divided in 2 diverging lobes at the tip. *Ovary* oblong, style a little longer than the corolla-lobes. *Fruit* not known.

PERAK: King's Collector 2940.—DISTRIB. Borneo, *Haviland* 3035.

3. *PAYENA HAVILANDI*, King & Gamble, n. sp. A large tree (?); branchlets grey, slender, innovations appressed rusty-pubescent. *Leaves* chartaceo-coriaceous; elliptic, abruptly acuminate at apex, attenuate usually unequally at base; glabrous above, glabrous beneath except on the midrib which is appressed-rusty-pubescent, margins recurved; 2.5 to 3 in. long, 1.25 to 1.75 in. broad; midrib slender; main-nerves 10 to 12 pairs, not very prominent, rather irregular, starting at about an angle of  $60^{\circ}$  with the midrib, meeting close to the margin in an intramarginal looped nerve; secondary nerves and reticulations scanty but prominent, raised beneath; petiole .4 to .5 in. long.

channelled above and bordered by the decurrent margins of the blade; stipules small, ovate-falcate, densely ferruginous-pubescent. *Flowers* fascicled, 3-4 together, in the axils of upper leaves or of terminal leafless branchlets, giving the appearance of a terminal corymbose inflorescence; pedicels .8 to 1 in. long, densely rusty-pubescent, recurved; buds ovate, .25 in. long, obtuse. *Calyx-lobes* 4, outer pair rounded, thick, appressed pubescent to nearly glabrous; inner pair thinner, scarious, ciliate. *Corolla* campanulate, .3 to .4 in. long, longer than the calyx, glabrous; lobes 8, oblong, cordate at base, crenate or ciliate on the margins, veined; tube as long as lobes. *Stamens* 16, usually in 2 rows; filaments slender, glabrous; anthers ovate, the connective broad and produced in a broad glabrous acumen, sharp in bud, flattened later on. *Ovary* linear-oblong; style slender, .5 in. long. *Fruit* an obpyriform fleshy berry, 1.5 in. long and .75 in. broad, surmounted by the persistent conical style, seed 1. *Seed* oblong, 1 in. long, .6 in. broad, flattened; testa crustaceous, shining, chestnut-brown; hilum narrow, elongated; albumen thick; cotyledons broadly oblong, .5 in. long, nerved; radicle rather large, nearly .15 in. long.

KEDAH: Lankawi Island, *Ridley* 8329. PENANG: *Curtis* 777. SINGAPORE: *Ridley* 4959, 9203.—DISTRIB. Borneo, *Haviland* 2098, 2320.

*P. CROIXIANA*, Pierre in Bull. Soc. Linn. Par. I. 524 seems to be this species or very near it. The following is Pierre's description:—

A huge tree. *Leaves* oval or sub-oblong, long acuminate, glabrous; 2-3 in. long, .3 in. broad; main-nerves 24 to 28, petiole .25 in. *Flowers* 3, axillary, sub-terminal; peduncles .2 to .3 in. long, .6 in. in fruit. *Sepals* ovate, ciliate. *Corolla-tube* pubescent without; lobes oblong, truncate at the apex, ciliate; filaments very short; anthers sub-oblong with a long connective, obtuse, pilose on both sides. *Ovary* 8-celled, tomentose, urceolate at the base of the style. *Berry* oblong, .8-1.2 in. long, .5-.6 in. broad, glabrous, 1-seeded; pericarp .06 in. thick; hilum under .04 in. broad, laterally extended over the whole height; cotyledons .8 in. long; .02 in. broad, radicle .14 in. long.

MALACCA: St. Pol Lias; Mad. Errington de la Croix in Paris Mus. "*Sundek*."

4. *PAYENA LEERII*, Benth. & Hook. f.; Pierre in Bull. Soc. Linn. Par. i. 524 (1885). A tree, reaching 80 to 100 feet in height and a considerable girth; branchlets grey, slender; innovations minutely rusty-pubescent. *Leaves* chartaceous; elliptic, abruptly acuminate at apex, acute or somewhat rounded at base; upper surface glabrous, shining, lower surface sparsely pubescent to glabrous; margins undulate, recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib prominent, impressed

above; main-nerves 14 to 18 pairs, slender, about .2 in. apart, inconspicuous, more or less parallel, starting at an angle of about 80° with the midrib, straight almost to the margin where they are connected by a looped intramarginal nerve; secondary nerves many, forking backwards, reticulations faint; petiole slender, .75 in. long, channelled above by the decurrent margins of the blade; stipules short, subulate, pubescent, very caducous. *Flowers* fascicled, 3-4 together, in the axils of upper leaves, or on terminal leafless branchlets, giving the impression of a terminal inflorescence; pedicels slender, .4 in. long, pubescent. *Calyx-lobes* 4, .15 in. long, the 2 outer ovate-valvate, minutely pubescent; the 2 inner ovate, truncate at apex, almost scarious on the margins, pubescent, imbricate. *Corolla* campanulate; tube .05 in. long, glabrous; lobes 8, imbricate, the 4 rather smaller outer embracing the 4 larger inner, ovate-obtuse, .15 in. long. *Stamens* 16, inserted in one row on the top of the corolla-tube, those opposite the lobes longer than and behind those alternate with them; filaments very short, hairy; anthers ovate, .075 in. long, extrorse, the connective produced in a rather thick penicillate mucro. *Ovary* villous, depressed, obscurely 8-lobed; style subulate, glabrous above, pubescent below, .2 in. long; cells 8. *Fruit* an ovate-oblong conical reddish-green berry, 1.5 to 1.75 in. long, obscurely ribbed and rough, at first tipped with the conical remains of the style, afterwards truncate seed 1. *Seed* 1 in. long, about .4 in. broad, oblong; testa thin crustaceous, dark brown; hilum long, narrow; albumen thin; cotyledons oblong, .85 in. long, .35 in. broad, faintly 3-nerved; radicle small, inferior. Kurz in Journ. As. Soc. Beng. XL. (1871) II. 69; Burck in Ann. Jard. Buit. V. (1885) 56, tab. VIII.; Engl. and Prantl Pflanzenfam. IV. i. 133, fig. 70. *Keratephorus Leerii*, Hassk. Retzia I. (1856) 101; Miq. Fl. Ind. Bat. II. 1039. *Azaola Leerii*, Teysm. & Binnend. in Nat Tijdschr. Neerl. Ind. VI. 116.

PERAK: Wray 1539, at 4,900 feet on Batang Padang; *King's Collector* 523. SINGAPORE: *Cantley* 20.—DISTRIB. Sumatra, Bangka, Borneo (?), Amboina. Vern. "Getah Sundek." It gives a second-rate variety of guttapercha.

To this species probably belong *Ridley* 11313, *Curtis* 3631, and *David* 10857, all apparently from Sumatra—Vern. "Getah Sundi." The specimens have leaves only.

*Curtis*' No. 3640 "Getah Sundek" from the Dindings is either this species or *P. Havilandi*; but the fruit is globose, not elongate or obconical. It seems, however, to have been more or less attacked by insects, and may not show its proper shape.

5. PAYENA LUCIDA, A. DC. Prod. VIII. 197 (1844). An evergreen tree

reaching a height of 60 feet and considerable girth; branchlets slender, dark brown, innovations rusty-tomentose. *Leaves* chartaceous; elliptic, elliptic-oblong or elliptic-lanceolate, obtusely and rather abruptly caudate-acuminate at apex, acute at base and unequal-sided; glabrous on both surfaces, the margins slightly recurved; 4 to 5 in. long, 1.5 to 2 in. broad; midrib prominent, slender; main-nerves 10 to 12 pairs, not prominent, rather irregular, .3 to .4 in. apart, starting at an angle of about 60° with the midrib, straight at first, arching near the margin to meet in a looped intramarginal nerve; secondary nerves and reticulations rather scanty; petiole .4 in. long, channelled above; stipules very minute, linear, silky-pubescent, caducous. *Flowers* fascicled, 1 to 4 together, in the axils of upper leaves; pedicels slender, .7 to .8 in. long, somewhat clavate, minutely silky; buds conical, .1 to .2 in. long. *Calyx-lobes* 4, 2 outer valvate, thick, enclosing 2 inner, broad, ovate, obtuse, ciliate, often scarious on the margins, .2 in. long. *Corolla* white, campanulate, .2 to .3 in. long; tube short; lobes 8, oblong, obtuse or rounded in 2 rows, 4 outer enclosing 4 inner. *Stamens* 16, .12 in. long; filaments short, thick; anthers ovate, the connective produced into an obtuse, glabrous, often bifid acumen, cells extrorse. *Ovary* villous, rounded; style subulate, glabrous, .3 in. long, 6-celled. *Fruit* an oblong, ferruginous-pubescent berry, 1 to 1.5 in. long, .7 in. broad, 1-seeded. *Seed* oblong, bluntly acute at both ends, flattened, .8 in. long, .5 in. broad, .3 in. thick; testa chartaceous, chestnut-brown, shining; hilum about .15 in. broad occupying the whole inner edge; albumen thick; cotyledons oblong, thin, flat, faintly nerved as the leaves, .6 in. long, .4 in. broad; radicle rather large, inferior. Kurz For. Fl. II. 121, Journ. As. Soc. Beng. XL. ii. 69, and XLVI. ii. 230; Clarke in Hook. f. Fl. Br. Ind. III. 547; Pierre in Bull. Soc. Linn. Par. I. 525. *Mimusops lucida*, Wall. Cat. 4147; G. Don Gen. Syst. IV. 35 (not of Poir.).

PENANG: Wallich 4147. PERAK: Scortechini 1989; Wray 2266, 3114, 3191, 3482; King's Collector 3364, 3734, 6636. SINGAPORE: Lobb 307; Ridley.

VAR. *Wightii*, Clarke in Hook. f. Fl. Br. Ind. III. 548. *Leaves* large, up to 6 in. long and 2.5 broad, coriaceous; pedicels stout; sepals large, rusty-tomentose. *Payena polyandra*, Bth. & Hook. f.; Pierre in Bull. Linn. Soc. Par. I. 526. *Isonandra polyandra*, Wight Ic. t. 1589. *Keratephorus Wightii*, Hassk. in Retzia I. 101.

Of this variety Clarke makes two forms, which he distinguishes chiefly by the former having short acuminations to the leaves, the latter long acuminate leaves. We have separated the material into these two groups as well as we can.

Form (1): Leaves up to 6 in. long, 2.5 in. broad, abruptly acuminate, shining



above, ferruginous-red beneath when dry; flower-buds ovoid, .2 in. long or more, rusty-pubescent. Pedicels stout, clavate; fruit oblong, depressed at top; anther-connective not so broad as in *P. lucida*.

MALACCA: Griffith (K.D.) 3605 (part); Maingay (K.D.) 194; Hervey; Derry 937; Holmberg 794; Goodenough 1977. PERAK: King's Collector 8705.

Form (2): Leaves up to 6 in. long, oblong-lanceolate, long-acuminate, reddish beneath when dry; nerves more prominent than in *P. lucida*; pedicels slender, .8 to 1.2 in. long; buds ovoid, sometimes flattened, .2 to .3 in. long, rusty-pubescent; young fruit oblong conical, tipped by the persistent style; old fruit oblong, over 1 in. long. *P. costata*, King MS. in Herb. Calc.

MALACCA: Griffith (K.D.) 3605 (part); Maingay (K.D.) 959; Goodenough 1853; Derry 654; Curtis 3644, 3660. PENANG: Curtis 1516. PERAK: King's Collector 3734, 4081, 7842, 7957, 10466, 10496, 10978. PAHANG: Ridley 2672. SELANGOR: Goodenough 10545. SINGAPORE: Ridley 3995, 5070, 6508, 11305.

VAR. *nigra*, King & Gamble. Leaves much larger than in the specimens of true *P. lucida*, elliptic, long caudate-acuminate at apex, more or less rounded at base, undulate on the margins, 6 to 8.5 in. long, 2.5 to 4 in. broad; main-nerves and intramarginal nerve very prominent, raised beneath; flower-buds and pedicels often golden-pubescent. Flowers as in *P. lucida*.

PERAK: Wray 1170; Scortechini.

P. LOWIANA, Pierre in Bull. Soc. Linn. Par. I. 524, seems to be one of the varieties of *P. lucida* or a species allied to it. The following is Pierre's description:—

A huge tree. Leaves with petiole .4 in. long; blade 5 in. long, 1.2–1.6 in. broad, oblong-lanceolate, obtusely acuminate, glabrous; main-veins 24, distant. Fruiting peduncles axillary, 1–1.2 in. long, solitary. Berry oblong, 1.3 in. long by .8 in. broad, sub-glabrous, crowned at the top with the remains of the style. Seed solitary, 1.1 in. long, .35 in. in diam., erect; hilum lateral, .08 in. broad; cotyledons oblong, attenuate at the apex, .8 in. long by .2 in. broad; radicle .15 in. long. *P. lucida* MS. in Herb. Mus. Par.

PERAK: Sir Hugh Low; St. Pol Lias No. 272.

6. PAYENA DASYPHYLLA, Pierre in Bull. Soc. Linn. Par. I. 527 (1885). A large tree, reaching 80 to 100 feet in height and considerable girth; branches spreading, branchlets greyish-brown, moderately thick; innovations densely ferruginous-pubescent. Leaves membranous; oblong or elliptic-oblong or obovate-oblong, often unequal-sided; acuminate at apex, acute, cuneate or somewhat rounded at base; glabrous above except on the midrib and near the base, densely ferruginous-pubescent beneath, when old nearly glabrous; 4 to 8 in. long, 1.5 to 3 in. broad; midrib thick, pubescent on both surfaces; main-nerves 12 to 16 pairs, unequally spaced, starting at about 60° with the midrib, produced straight to meet a looped intramarginal nerve; secondary

nerves rather prominent, reticulations irregular; petiole .5 in. long, thick, densely rusty-pubescent, channelled above; stipules subulate, rusty-pubescent, short, early caducous. *Flowers* fascicled, 1 to 3 together, in the axils of the leaves; pedicels thickly rusty-pubescent, .4 to .6 in. long, somewhat enlarged in fruit; buds ovoid. *Calyx-lobes* 4, 2 outer thick, valvate, .3 in. long, triangular-rounded, densely rusty-pubescent; 2 inner concave, slightly imbricate, .35 in. long, thickly keeled, scarious on the margins and ciliate, rusty-pubescent around the keel. *Corolla* tubular-campanulate, .3 in. long; tube .1 in. long, glabrous; lobes 8, the 4 outer enclosing the 4 inner but inserted in one row, oblong, obtuse. *Stamens* 16, .175 in. long, inserted on the top of the tube; filaments .05 in. long, villous; anthers nearly linear, extrorse, the connective produced in a .05 in. long, blunt or even bifid acumen. *Ovary* conical, villous as is the base of the .35 in. long subulate style. *Fruit* an ovoid densely tawny-pubescent berry .75 to 1 in. long, umbonate at the tip and crowned with a portion of the style. *Seeds* .4 to .5 in. long, elliptic-acute; testa dark brown, shining; hilum narrow; albumen thin. Burck in Ann. Jard. Buit. V. 51. *Isonandra dasypphylla*, Miq. Pl. Jungh. 201 and Fl. Ind. Bat. II. 1038; de Vriese Journ. Bot. Neerl. I. 256.

PERAK: *Scortechini* 1242; *King's Collector* 2611, on Larut Peak at 3,000 to 3,500 feet.—DISTRIB. Sumatra, Java.

De Vriese says the gutta is only used for adulteration, but that Motley did not agree in this belief.

VAR. *glabrata*, King & Gamble. Lower surface of the leaves nearly glabrous, apex abruptly long-acuminate; pedicels .8 to 1 in. long; fruit nearly spherical.

PERAK: *Scortechini* 536. SINGAPORE: at Selitar, *Ridley* 5644.

7. *PAYENA SESSILIS*, King & Gamble, n. sp. A tree (?); branchlets grey, rough, uppermost somewhat angular when dry. *Leaves* coriaceous, sessile; obovate, obtuse or emarginate; glabrous on both surfaces, margins recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces; main-nerves not prominent on the upper surface, raised on the lower, about 8 pairs, at about 50° with the midrib, straight but soon anastomosing with the prominent reticulations which are also raised on the lower surface; stipules ovate, acute or obtuse, glabrous, caducous. *Flowers* fascicled, 2 to 3 together, on small tubercles in the axils of upper leaves; pedicels slender, black, .5 in. long, supported by small hard glabrous bracts. *Calyx-lobes* in fruit 4, .2 in. long, ovate-acute, glabrous; rest of flower not seen. *Fruit* a globose glabrous berry, black when dry, prominently surmounted by the

persistent long curved style; cells apparently 4 to 6. *Seeds* oblong, obtuse at top, acute at base, .3 to .4 in. long, rounded on the outer, straight on the inner side; hilum long, narrow; testa thin crustaceous, brown; albumen rather thin; cotyledons oblong, flat, .15 to .2 in. in length; radicle rather large,

SINGAPORE: *Ridley* 5076.

8. *PAYENA OBTUSIFOLIA*, King & Gamble, n. sp. A tree; branchlets stout, greyish-brown, prominently marked by the scars of fallen leaves and the tubercles of fallen flower fascicles, young branchlets and leaves rusty-brown in colour. *Leaves* coriaceous; clustered at the ends of the branchlets, obovate or elliptic-obovate, obtuse, emarginate or shortly acute at apex, cuneately attenuate at base; glabrous on the upper surface, rusty-coloured and sometimes pubescent on the lower; 2.5 to 3 in. long, 1 to 1.5 in. broad; midrib stout, main-nerves 10 to 12 pairs, starting at about 60° with the midrib, slightly curving upwards, inconspicuous above as are the reticulations; petiole .5 to .75 in. long, channelled above by the decurrent margins of the blade. *Flowers* fascicled, 4 to 8 together (to judge by scars only) in the axils of the leaves, or of the scars of fallen leaves; pedicels .5 in. long, clavate, pubescent; buds about .3 in. long, truncate. *Calyx-lobes* 4, 2 outer valvate, ovate-acute, .3 in. long, pubescent; 2 inner imbricate, ovate, golden-pubescent on the back, ciliate on the margins. *Corolla* not seen. *Ovary* ovoid-conical, glabrous, 8-celled; style .35 in. long, linear. *Fruit* not seen.

PERAK: *Scortechini* 340.

9. *PAYENA SELANGORICA*, King & Gamble, n. sp. A tree (?); branchlets dark brown, rough. *Leaves* chartaceo-coriaceous; oblong-lanceolate, acuminate at apex, narrowly attenuate at base, glabrous above, slightly pubescent on the sides of the midrib beneath; 4 to 6 in. long, 1 to 1.7 in. broad; midrib prominent, impressed and keeled above; main-nerves about 16 pairs, indistinct, parallel, at about 80° with the midrib, straight at first, anastomosing near the margin with the secondary nerves and reticulations, which are visible but not prominent; petiole .5 to .7 in. long, channelled above, enlarged at base. *Flowers* fascicled, 2 to 3 together, in the axils of the leaves; pedicels rather thick, .6 to .8 in. long, striate, appressed rusty-pubescent. *Calyx-lobes* 4, outer pair valvate .3 in. long, ovate-acute, thick below, thinner above; inner pair ovate, .25 in. long, scarious on the margins; both appressed rusty-pubescent; rest of flower not seen. *Ovary* pubescent, cylindrical, depressed at top; fruit immature, seed apparently albuminous, with an elongated hilum.

SELANGOR: *Ridley* 7387.

6. *BASSIA*, Linn.

Trees with milky juice. *Leaves* coriaceous or chartaceous, often clustered at the ends of the branchlets; stipules caducous. *Flowers* fascicled, in the axils of the leaves or of the scars of fallen leaves, pedicellate, pedicels frequently reflexed. *Calyx-lobes* 4, the 2 outer usually valvate, enclosing the 2 inner imbricate. *Corolla* campanulate; tube broad; lobes 6 to 12, contorted in bud, erect in flower, imbricate. *Stamens* twice the number of the corolla-lobes or more, inserted in one or more rows on the corolla-tube; filaments usually short; anthers generally lanceolate, laterally or extrorsely dehiscent; connective generally produced in an acumen; staminodes none. *Ovary* villous, 4-12- (usually 6-8-) -celled; style linear, subulate, more or less elongate. *Fruit* a globose or oblong or ovoid berry, few-seeded. *Seeds* ellipsoid, usually compressed; testa crustaceous, shining; hilum oblong or linear, conspicuous; albumen none; cotyledons thick, fleshy; radicle small.—*DISTRIB.* About 40 species, found in India, Ceylon, the Malay Peninsula, and Malay Archipelago.

In several of the species the fruit is unknown, and some of these may prove, when it becomes available, to belong to *Payena*, which is hardly separable except by the important character of having albuminous seeds and leafy cotyledons.

We have not followed Baillon and Engler in changing the name of this genus to *Illipe*, as we agree in the opinions expressed by Drs. Trimen ("Flora of Ceylon") and Cooke ("Flora of Bombay") that the word *Illipe* was not intended by König to be employed as the name of a genus, but was merely mentioned as being the vernacular name employed by the natives of Malabar for one of the species.

- Flower-buds large, nearly .75 in. long, conical; intramarginal nerve of leaves prominent; pedicels thick, 1.5 to 2 in. long .. 1. *B. aristulata*.  
 Flower-buds moderately large, about .4 in. long, globose; intramarginal nerve present; pedicels short, about .4 in. long:—  
   Intramarginal nerve conspicuous; leaves 10 to 14 in. long .. 2. *B. Kingiana*.  
   Intramarginal nerve faint; leaves 4 to 6 in. long .. 3. *B. Kunstleri*.  
 Flower-buds moderately large, .4 in. long or rather less, conical:—  
   Leaves large, over 6 in. long; main-nerves prominent:—  
     Pedicels over 1 in. long; leaves coriaceous, silky-pubescent beneath; main-nerves straight, intramarginal nerve present; connective of anthers penicillate .. .. 4. *B. penicillata*.  
     Pedicels under .6 in. long; leaves chartaceous, sparsely pubescent beneath; main-nerves curved, no intramarginal nerve; connective of anthers not penicillate .. .. 5. *B. malaccensis*.  
   Leaves moderate-sized, under 6 in. long; main-nerves not prominent .. .. 6. *B. Curtisii*.  
 Flower-buds small, under .8 in. long, usually conical, generally in many-flowered fascicles:—  
   Pedicels usually under .5 in. long:—  
     Pedicels and flower-buds densely tawny-pubescent; connective of anthers produced in a long point .. .. 7. *B. laurifolia*.



- Pedicels and flower-buds thinly rusty-pubescent; connective of anthers produced in a short ciliate point .. .. 8. *B. rupicola*.
- Pedicels .5 in. long or longer:—
- Flowers fascicled in the axils of upper leaves generally, rarely on old wood below them:—
- Leaves glabrous, coriaceous, main-nerves indistinct .. 9. *B. perakensis*.
- Leaves grey-silky-pubescent beneath, almost coriaceous, main-nerves distinct but not prominent .. 10. *B. argentea*.
- Leaves only slightly pubescent beneath, chartaceous, main-nerves very prominent .. 11. *B. Braccana*.
- Flowers fascicled chiefly in the axils of the scars of fallen leaves, on old wood:—
- Leaves chartaceous, elliptic; main-nerves prominent .. 12. *B. longistyla*.
- Leaves coriaceous, oblong; main-nerves not prominent:—
- Main-nerves of leaves (under 6 in. long) curved upwards, but no intramarginal nerve; anther-connective long-apiculate .. .. 13. *B. cuprea*.
- Main-nerves of leaves (over 6 in. long) meeting in an intramarginal nerve; anther-connective shortly apiculate .. .. 14. *B. Motleyana*.

SPECIES OF WHICH FLOWERS ARE IMPERFECTLY KNOWN.

- Leaves under 5 in. long, obovate, obtuse, greenish-brown when dry .. .. 15. *B. cuneata*.
- Leaves 5 to 7 in. long, oblong-lanceolate, greyish-green when dry .. .. 16. *B. penangiana*.
- Leaves 6 to 8 in. long, obovate-oblong, orange-red when dry .. 17. *B. erythrophylla*.

1. *BASSIA ARISTULATA*, King & Gamble, n. sp. A tree; branchlets stout, brown, lenticellate. *Leaves* coriaceous; oblong; shortly and rather suddenly acute at apex, somewhat rounded unequally and then decurrent at base; glabrous on both surfaces except on the midrib beneath; margins slightly recurved; 6 to 10 in. long, 3 to 4 in. broad; midrib thick, prominent, impressed above; main-nerves 24 to 28 pairs, conspicuous, parallel, .3 to .4 in. apart, starting at about 75° with the midrib, scarcely curved, meeting in a conspicuous intramarginal looped nerve; reticulations oblique, not prominent; petiole 1.5 to 2 in. long, grooved above, much thickened below. *Flowers* fascicled, about 2 to 6 together, in the axils of the leaves or of the scars of fallen leaves, on very short tubercles; pedicels thick, 1.5 to 2 in. long, densely golden-pubescent, flattened under the flower; buds elongate, conical, nearly .75 in. long. *Calyx-lobes* 4, .5 to .7 in. long; the 2 outer valvate, triangular-ovate, pubescent; the 2 inner imbricate, concave, ovate, pubescent. *Corolla-tube* short, .2 to .3 in. long, funnel-shaped, densely pubescent inside; lobes 8 to 9, oblong-lanceolate, .4 in. long, pubescent without. *Stamens* many, up to 36, in 2 or 3 rows, lowest row about 8 to 9, second row 16 to 18, third row 8 to 9, inserted on the top of the corolla-tube; filaments very short, pubescent; anthers

oblong, thin, .2 in. long, opening along their edge; connective black, prominent, ending in a long sharp awn, the anthers usually twisted half round. *Ovary* silky-pubescent, flat at top, style glabrous about equal to corolla, cells 10 to 12. *Fruit* not known.

PERAK: at Goping, *Scortechini* 1984.

Said by *Scortechini* to give a guttapercha.

2. *BASSIA KINGIANA*, Brace MS. in Herb. Calc. A tree, reaching 50 to 60 feet in height, and 10 to 15 in. in diam.; branchlets thick. *Leaves* coriaceous, dark green; obovate-oblong, rounded and then shortly and abruptly acuminate at apex, cuneate at base; glabrous on both surfaces, margins slightly reflexed; 10 to 14 in. long, 3.5 to 4.5 in. broad; midrib very strong, prominent; main-nerves about 20 pairs, conspicuous, .5 to .7 in. apart, starting nearly at right angles to the midrib and curving upwards to meet in a conspicuous intramarginal looped nerve; secondary nerves few but prominent; reticulations distant, not numerous; petiole 2 in. long, grooved above, swollen at base, and then conspicuously rugose when dry; stipules subulate-acuminate from a broad base, very quickly caducous. *Flowers* fascicled, about 3 to 5 together, on small tubercles above the scars of fallen leaves on the previous year's wood; pedicels recurved, thick, .4 in. long, enlarged above, covered as also the calyx with appressed tawny pubescence; buds globose, about .4 in. long. *Calyx-lobes* 4, .4 in. in diam.; outer 2 imbricate, rounded emarginate, thick; inner 2 also imbricate, concave, ciliate on the margins. *Corolla-tube* funnel-shaped, .15 in. long, rusty-hirsute without, pubescent within; lobes 12 to 16, white, much imbricate or in 2 rows, spatulate, ciliate on the margins, hirsute, .25 in. long. *Stamens* many, 32 to 36, in 2 rows on the top of the corolla-tube; filaments .1 in. long, rather stout, densely hirsute; anthers linear-oblong, .125 in. long; connective produced into a broad appendage, penicillate at tip, in bud merely aristate. *Ovary* rounded, villous; style thick, curved, pubescent, .3 in. long, with minute stigmatic lobes; cells about 8. *Fruit* a globose, thickly tawny-pubescent, berry, .75 in. in diam., surmounted by the long subulate persistent style, seeds 1 to 2. *Seed* not seen.

PERAK: *King's Collector* 3314, 3678, 7389; in open jungle at 300 to 500 feet. SINGAPORE: *Ridley* 6238, 6294.

3. *BASSIA KUNSTLERI*, Brace MS. in Herb. Calc. A tree with spreading branches, reaching a height of 30 to 40 feet and 10 to 15 in. in diam.; branchlets slender, grey, innovations rusty-pubescent. *Leaves* chartaceous; obovate-oblong or oblong, abruptly acuminate at apex, acuminate at base, glabrous on both surfaces; 4 to 6 in. long,

1.5 to 2 in. broad; midrib slender, prominent; main-nerves 15 to 20 pairs, starting at an angle of about  $60^{\circ}$  to the midrib and curving upwards to meet in a faint intramarginal looped nerve; secondary nerves and reticulations prominent; petiole slender, 1 to 1.5 in. long, bordered above in its upper part by the decurrent margins of the blade, base enlarged, sometimes twisted. *Flowers* solitary or fascicled 2 to 3 together in the axils of the leaves, or above the scars of fallen leaves; pedicels thick, .3 to .4 in. long, usually recurved, densely rusty- or golden-pubescent like the calyx-lobes and fruit; buds ovoid-orbicular about .4 in. long. *Calyx-lobes* 4, .4 in. long; outer valvate, ovate-orbicular; inner imbricate, concave, somewhat emarginate, thin and ciliate on the edges. *Corolla* tubular-campanulate; tube about .125 in. long, glabrous on both sides; lobes 16, in 2 rows, very much imbricate, shortly spatulate, rounded at top, fimbriate on the margins, shortly pubescent within, 3-nerved. *Stamens* about 32, in 2 rows, mixed with long unicellular brown hairs; filaments thick, about 0.5 in. long; anthers oblong, opening by marginal slits, often twisted half round; connective conspicuous, produced in a sharp mucro. *Ovary* rounded, villous; style subulate, .5 to .7 in. long; cells about 8. *Fruit* an ovoid densely pubescent brown berry, .8 to 1 in. long, 1-2-seeded, surmounted by the persistent style. *Seed* ovoid, obliquely pointed below, rounded above, .7 in. long, .4 in. in diam., sometimes flattened on one side; testa thin, crustaceous, chestnut-brown, shining; hilum very large, obovate; albumen none; cotyledons thick, .5 in. long, ovate; radicle small, pointed.

PERAK: on Larut peak, at 500 to 2,600 feet, *King's Collector*, 3241, 3547, 3964, 6410; *Wray* 2643, 3201; *Curtis* 3694; *Ridley* 5536.

4. *BASSIA PENICILLATA*, King & Gamble, n. sp. A large tree, reaching 60 feet in height with a girth of 4 feet; ultimate branchlets and innovations densely ferruginous-pubescent. *Leaves* coriaceous; oblong or somewhat obovate-oblong, shortly and abruptly acute at apex, unequally rounded at base; glabrous above, thickly golden-silky-pubescent beneath when young, afterwards glabrate; margins recurved; 6 to 10 in. long, 2.5 to 3.5 in. broad; midrib thick, prominent, impressed and keeled above; main-nerves 24 to 28 pairs, conspicuous, parallel, .3 to .5 in. apart in large leaves, starting at about  $80^{\circ}$  with the midrib, curved only near the margin to meet in an inconspicuous looped intramarginal nerve; secondary nerves many in large leaves; reticulations oblique, not prominent; petiole 1.2 to 1.5 in. long, thickened below. *Flowers* fascicled, about 1 to 4 together in the axils of the leaves, on very short rusty-pubescent tubercles; pedicels 1 to 1.2 in. long, slender, pubescent; buds conical. *Calyx-lobes* 4, sometimes 5, .4 in. long; outer pair ovate-acuminate, densely rusty-pubescent, thick; inner pair,

sometimes 3, ovate acuminate, thinner, pubescent on the back, ciliate and more or less scarious on the margins. *Corolla* campanulate, .4 in. long; tube nearly .2 in. long, glabrous outside, densely ferruginous hairy within in the upper half; lobes 10 (?), lanceolate, acuminate, as long as tube. *Stamens* 20 in 1 row, but the 10 opposite the corolla-lobes behind the 10 alternate with them; filaments .05 in. long, hairy; anthers linear-sagittate, extrorse, the connective produced in a long penicillate acumen. *Ovary* rounded, densely hairy, as is the lower half of the .75 in. long slender style; cells 10. *Fruit* not known.

PROVINCE WELLESLEY: at Tassek Glugor, *Curtis* 3737, said to be common. Vern. name "*Minjato*."

In its leaves this species greatly resembles *B. aristulata*, but the slender pedicels, smaller flowers, acuminate calyx, and penicillate anthers at once distinguish it.

5. *BASSIA MALACCENSIS*, King & Gamble. A large tree(?); branchlets dark brown, rough, with prominent old leaf-scars, innovations nearly glabrous. *Leaves* chartaceous or almost membranous; obovate or obovate-oblong, obtuse or shortly and abruptly acute at apex, cuneate at base; glabrous above, sparsely and minutely pubescent beneath when young, glabrous when old; 6 to 12 in. long, 4 to 6.5 in. broad; midrib prominent, thick; main-nerves very conspicuous, 14 to 16 pairs, parallel, in average leaves .5 in. apart, in large ones often nearly 1 in., starting at an angle of 60° with the midrib, at once curving gently upwards to and along the margin; secondary nerves few, reticulations mostly transverse, not prominent; petiole 1 to 2 in. long, slightly bordered above to about half-way down by the decurrent margins of the blade, base much swollen, wrinkled. *Flowers* fascicled 4 to 8 together in the axils of the leaves or of the scars of fallen leaves, on rather thick pubescent tubercles; pedicels .4 to .6 in. long, pubescent; buds when young rounded-conical. *Calyx-lobes* 4; 2 outer valvate or slightly imbricate, ovate, bluntly acute or mucronate, rusty-pubescent, .25 in. long; 2 inner imbricate, ovate-acute, margins sometimes scarious, sometimes ciliate, back thickly rusty-pubescent, more or less keeled. *Corolla* campanulate; tube very short, rarely .1 in. long, with a short ring of hairs at the mouth inside; lobes 10-12, lanceolate, obtuse, sub-2-seriate, .25 to .3 in. long, glabrous except for a few stiff hairs outside. *Stamens* 20 to 24 in 2 rows; the inner almost or quite sessile, alternate with the corolla-lobes; the outer with short densely pubescent filaments, longer than the inner ones; anthers narrowly lanceolate with long hairs, opening on the margins; connective produced in a long hair-like acumen. *Ovary* hairy, elongate, conical, style .25 in. long. *Fruit* a fleshy obovate-oblong berry with somewhat flattened top, surmounted



by the persistent base of the style and supported by the persistent calyx-lobes, nearly 1 in. long. *Seed* 1, oblong, acute at the top, .7 in. long, .35 in. broad, and about .3 in. thick; testa shining, crustaceous, chestnut-brown; hilum .15 to .2 in. broad; albumen none; cotyledons thick, inner face somewhat striate; radicle rather large, inferior. *Payena malaccensis*, Clarke in Hook. f. Fl. Br. Ind. III. 547. *Keratephorus Wightii*, Maingay MS. (not of Hassk.).

MALACCA: *Griffith* (K.D.) 3610; *Maingay* (K.D.) 992. PERAK: *Wray* 1229; *Scortechini* 314. SINGAPORE: *Ridley* 2082, 2757, 5643, 6042, 6132, 6133, 6498, 6499, 6500, 6531, 8078, 10159.

Wray says this species gives only a sticky gutta in small quantities.

6. *BASSIA CURTISII*, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height; branches greyish-brown, strongly marked by the scars of fallen leaves and the prominent tubercles of fallen flowers, innovations very slightly rusty-pubescent, thick. *Leaves* very coriaceous; clustered at the ends of the branchlets, obovate or sometimes lanceolate-obovate, obtuse emarginate or very suddenly and shortly blunt-acuminate; glabrous on both surfaces, margins strongly recurved; 4 to 6 in. long, 1.25 to 2.5 in. broad; midrib stout, prominent; main-nerves not prominent, 14 to 15 pairs, at an angle of about 70° with the midrib, .3 to .4 in. apart, straight, joined near the margin by a looped intramarginal nerve; secondary nerves prominent, reticulations few; all raised on the under surface; petiole .7 to 1 in. long, rather thick, bordered by the decurrent margins of the blade, base swollen. *Flowers* fascicled, many (10 to 12) together on prominent tubercles in the axils of the scars of fallen leaves below the leaf-cluster, and covering the branchlets densely for a distance of about 4 in.; pedicels .25 (buds) to .5 (flower) in. long, somewhat angular, decurved, densely pale tawny-pubescent; buds ovoid-conical. *Calyx-lobes* rounded, obtuse, densely tawny-pubescent, .2 in. long, the outer pair thick, the inner somewhat keeled, scarious on the margins. *Corolla* campanulate, rather longer than the calyx; tube short, glabrous except for the ring of hairs at the insertion of the stamens; lobes 8, oblong spathulate, ciliate and hirsute at the tip. *Stamens* 16; filaments short, slender, villous; anthers ovate-acute, the connective ending in a sharp conical acumen, extrorse. *Ovary* rounded, villous; style thick glabrous, stigmas minute; cells 8. *Fruit* an oblong berry, covered without with appressed golden pubescence, .5 to .7 in. long, .5 in. broad, crowned with the persistent style and supported by the persistent calyx; seeds 1-2, placentas thin. *Seeds* oblong, pointed at the ends; testa crustaceous, shining; hilum narrow; albumen none; cotyledons thick, fleshy, radicle small.

PENANG: *Curtis* 1451, 3536. PERAK: *Wray* 512, Vern. "Gutta Gannu"; *Scortechini* 1408.

This species comes near both to *B. Motleyana*, from which it differs in having more coriaceous leaves, larger flowers, and a pubescent fruit; and to *B. cuneata*, in which the leaves (judging from the poor specimens in Kew Herbarium) are thinner and the fruit larger and nearly glabrous, with more rounded seeds and a broad hilum.

7. *BASSIA LAURIFOLIA*, King & Gamble, n. sp. A tree reaching 60 feet in height and a diam. of 12 to 18 in.; branches spreading; branchlets pale brown, rather thick, innovations densely pubescent with yellowish-tawny hairs. *Leaves* chartaceous; obovate-lanceolate, gradually acuminate at apex, also at base; glabrous on both surfaces except on the sides of the midrib beneath; 5 to 10 in. long, 1.5 to 3.5 in. broad; midrib prominent, impressed and keeled above; main-nerves prominent, regular, 14 or 15 pairs, about .3 in. apart, starting at about 45° with the midrib, gradually curving upwards; reticulations obliquely transverse, faintly marked; petiole .75 to 1 in. long, slender, glabrous above, tawny-pubescent at base, bordered by the decurrent margins of the blade and marked above by the produced keel of the midrib; stipules linear-subulate, tawny-pubescent, nearly .5 in. long, very caducous. *Flowers* fascicled, about 6 together, on hairy tubercles in the axils of the leaves or of the scars of fallen leaves near the top of the branchlets; pedicels .4 to .5 in. long, usually recurved, densely tawny-pubescent, thicker in fruit; buds small, conical. *Calyx-lobes* 4, about .2 in. long, rather narrowly ovate; the outer pair obtuse; the inner acute, all densely tawny-pubescent without, glabrous within. *Corolla* campanulate; tube .05 in. long with a ring of hairs at the mouth inside; lobes 8, oblong-spathulate, .1 in. long, glabrous. *Stamens* 14 to 16, .1 in. long; filaments short, thickly hairy; anthers linear-sagittate, the connective produced in a long sharp acumen. *Ovary* rounded, glabrous; style slender, .3 in. long; cells apparently 8. *Fruit* a black glabrous oblong berry about .6 to .7 in. long and .4 in. broad. *Seed* 1, ovoid, .5 to .6 in. long, slightly compressed; testa thin, crustaceous, shining, dark brown; hilum broad; albumen none; cotyledons oblong, fleshy, about .3 in. long and nearly .2 in. broad; radicle inferior, rather large.

PERAK: on low ground, *King's Collector* 3104, 3718, 3720.

*VAR. obtusa*, King & Gamble. *Leaves* obtuse with an abrupt acumen. *Calyx-lobes* obtuse, thickened at tip. *Corolla-lobes* ciliate at the apex, glandular-striate; anthers and produced connective very hirsute.

PENANG: *Curtis* 159, 2254, 3589—a small tree, fairly common.

*VAR. parvifolia*, King & Gamble. *Leaves* smaller than in type;

innovations not tawny-pubescent. *Calyx-lobes* more rounded and glabrous; pedicels longer.

KEDAH: on Kedah Peak, Ridley 5506.

Ridley's No. 2673 from Tahan Woods, Pahang, is very near *B. laurifolia*, but the pedicels are much longer and the calyx-lobes not tawny-pubescent. The material is insufficient for description.

8. *BASSIA RUPICOLA*, King & Gamble, n. sp. A tree reaching 40 to 60 feet in height and 15 to 20 in. in diam.; branchlets dark grey, marked by the prominent scars of fallen leaves, innovations puberulous; leaf-bud scales ovate-lanceolate, .25 in. long. *Leaves* coriaceous; obovate-oblong, bluntly acute at apex, cuneately attenuate at base; dull and glabrous on both surfaces; 3.5 to 5.5 in. long, 1.5 to 2 in. broad; midrib thick, conspicuous; main-nerves 8 to 10 pairs, starting at an angle of 45° with the midrib, then curving upwards, sometimes rather indistinct, about .4 in. apart; reticulations many, obscure, obliquely transverse; petiole .5 to 1 in. long, grooved above and bordered by the decurrent base of the blade, swollen below. *Flowers* fascicled, about 5 together, in the axils of the leaves, on small tubercles; pedicels .15 in. long, ferruginous-pubescent like the calyx and buds. *Calyx-lobes* 4, 2 outer valvate; 2 inner valvate or imbricate, ovate, .2 to .25 in. long; all more or less recurved and ciliate at tip. *Corolla* tubular-campanulate, lobes and tube nearly equal, mouth of tube inside with a ring of soft ferruginous hairs; lobes oblong, ciliate at tip, sparsely hairy without, nerves spreading. *Stamens* 16, inserted above the ring of hairs in the mouth of the tube; filaments slender, .05 in. long, pubescent; anthers ovate-mucronate, tip ciliate, extrorse. *Ovary* ovoid; style curved, .3 in. long, stigma flat, minute. *Fruit* not seen.

PERAK: in rocky creeks on Gunong Batu at 1,500 to 2,000 feet, King's Collector 7411.

9. *BASSIA PERAKENSIS*, King & Gamble, n. sp. A tree reaching 60 to 80 feet in height and a considerable girth; branchlets thick, dark grey, prominently marked by the scars of fallen leaves and the tubercles on which the flower fascicles grew. *Leaves* coriaceous; oblong or obovate-oblong, shortly and abruptly acuminate at apex, acuminate narrowed at base; margins recurved, glabrous on both surfaces; 4 to 6 in. long, 1.5 to 2.5 in. broad; midrib stout, prominent; main-nerves slender, indistinct, 14 to 18 pairs, starting at an angle of 50° with the midrib, parallel, straight at first, arching near the margin to join in an intra-marginal looped nerve which is also met by the secondary nerves between the main ones; reticulations faintly marked on both surfaces; petiole .75 to 1 in. long, rather thick, bordered above by the decurrent

margins of the blade, swollen below. *Flowers* in fascicles of up to 10 to 12, on tubercles in the axils of the leaves or above the scars of fallen leaves on the previous year's wood; pedicels .5 to .6 in. long, slender, flattened below the flowers, densely pubescent at first, afterwards nearly glabrous, recurved in fruit; buds small, conical. *Calyx-lobes* 4, .2 in. long; 2 upper ovate-acute, densely pubescent, valvate; 2 lower imbricate, also densely pubescent, ciliate on the margins, somewhat keeled, ovate-acute. *Corolla* funnel-shaped; lobes 8, throat villous. *Stamens* about 16; filaments short glabrous; anthers sagittate. *Ovary* globose, villous, 8-celled, style .3 to .4 in. long, stigma minutely lobed. *Fruit* an ovoid densely pubescent berry about .7 to .9 in. in diam., crowned by the persistent style; seeds 1-2. *Seed* ovoid-oblong, .65 in. by .35 in., acute at base; testa shining, chestnut-brown, thin, crustaceous; hilum large, oblong; albumen none; cotyledons oblong, .45 in. long, .25 in. broad, radicle very small.

PERAK: *King's Collector* 512, 3846; *Curtis* 3695, on the Larút hill up to 2,500 feet.

10. *BASSIA ARGENTEA*, Clarke in Hook. f. Fl. Br. Ind. III. 545 (1882) (*not of de Vriese*). A large tree; branchlets rather thick, greyish-brown. *Leaves* coriaceous-chartaceous; elliptic or elliptic-oblong, abruptly acuminate at apex, acute and often unequal at base; glabrous above, shining grey-silky beneath when young, nearly glabrous when old; 4 to 7 in. long, 2.5 to 3 in. broad; midrib prominent, thick; main-nerves 13 to 15 pairs, about .4 in. apart, starting at about 60° with the midrib, at first straight then curving upwards; reticulations many, very oblique; petiole 1 in. long, upper part bordered by the decurrent margin of the blade, swollen below and rugose. *Flowers* fascicled in clusters of 6 to 10 in the axils of the leaves, or above the scars of fallen leaves; pedicels slender, about .5 in. long, appressed-pubescent; buds conical. *Calyx-lobes* 4, outer and inner pairs both valvate; lobes ovate, .2 to .25 in. long, acute, pubescent. *Corolla* tubular-campanulate, tube .1 in. long; lobes 8 to 9, .15 in. long, linear-oblong. *Stamens* usually 24, in 3 rows, inserted on the top of the tube on a ring of rusty hairs; filaments very small or none; anthers ovate, densely hirsute, black-apiculate. *Ovary* rounded, depressed above, villous; style .2 to .3 in. long, villous half-way up, subulate; stigma capitate; cells 8 to 10. *Fruit* not seen.

MALACCA: *Maingay* (K.D.) 991, 1524; *Derry* 941.

*Bassia argentea*, de Vriese, seems to be a *Sideroxylon*, cf. Burek & Koord. & Val.

11. *BASSIA BRACEANA*, King & Gamble, n. sp. A tree with spreading branches, reaching 50 to 70 feet in height and 10 to 20 in. in diam.; branchlets pale brown. *Leaves* chartaceous; bright green, glossy.



oblong or elliptic-oblong, acuminate both at apex and at base; glabrous above, minutely pubescent on the nerves or in the axils of the nerves beneath; 4 to 8 in. long, 2 to 3 in. broad; midrib thick, impressed above; main-nerves 14 to 18 pairs, regular, parallel, conspicuous, about .4 in. apart, starting at about 60° with the midrib, arching upwards to join near the margin; reticulations oblique, slender but conspicuous, joining the main-nerves more or less horizontally; petiole .8 to 1.4 in. long, grooved above and bordered by the decurrent margins of the blade, thickened and somewhat curved below. *Flowers* fasciculate, usually 4 to 7 together, in the axils of the leaves, or above the scars of fallen leaves on the last year's wood below; pedicels .4 to .6 in. long, thickened above, otherwise slender, slightly pubescent. *Calyx-lobes* 4, .15 to .25 in. long; 2 outer opposite ovate rounded, enclosing the 2 inner concave rounded; sometimes ciliate on the margins, sometimes slightly emarginate, all more or less golden-pubescent without, enlarged after flowering. *Corolla* cream-coloured; tube cylindrical, short, about .1 in. long only; lobes more or less spreading, 8 to 9, linear-oblong, .2 in. long, slightly twisted. *Stamens* 16 to 18, in 2 rows, inserted on the top of the tube inside above a thick ring of tawny hairs; filaments very short; anthers ovate-lanceolate, strigosely hirsute, the connective ending in a long dark acumen. *Ovary* globose, glabrous; style .15 in. long, stigmas very minute; cells about 8. *Fruit* an oblong green fleshy berry, .8 to 1 in. long, crowned by the remains of the style; seed usually 1 only. *Seed* ovoid, flattened, .8 in. long, .5 in. broad, and .25 in. thick; testa chestnut-brown, shining, crustaceous; hilum elongate, pale, conspicuous; albumen none; cotyledons thick, .5 to .6 in. long, ovoid, somewhat acute; radicle minute.

PENANG: *Curtis* 3063. PERAK: *King's Collector* 1846, 3195, 3275, 3740, 6447, 7584, 10412; *Scortechini* 314, 1483; *Wray* 1775, 2613, 2694.

*VAR. lanceolata*, King & Gamble. *Leaves* narrower, more lanceolate-acuminate; main-nerves closer. *Flowers* more numerous in the fascicles and fascicles more numerous on the last year's wood. *Corolla-lobes* often unequal in length, acute. *Anthers* with the acumen bifid.

PERAK: *Wray* 189, 1248, up to 3,400 feet.

13. *BASSIA LONGISTYLA*, King & Gamble, n. sp. A large tree, reaching 80 to 100 feet in height; branchlets thick, dark greyish-brown, innovations minutely pubescent. *Leaves* chartaceous; elliptic, shortly and rather abruptly acuminate at both apex and base; glabrous on both surfaces; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves 12 to 14 pairs, leaving the midrib almost at right

angles and curving upwards to meet near the margin; secondary nerves somewhat prominent as are the reticulations; petiole .6 to .8 in. long, slender, grooved above. *Flowers* fascicled, often up to 10 together, on tubercles above the scars of fallen leaves on the last year's wood; pedicels slender, glabrous, .5 to .7 in. long. *Calyx-lobes* 4, .15 to .2 in. long, ovate, somewhat acute, somewhat pubescent outside, the 2 outer enclosing the 2 inner. *Corolla* with very short (.05 in. long) cylindrical tube; lobes 8 to 9, rather spreading, oblong-lanceolate, obtuse or emarginate, prominently nerved, glabrous. *Stamens* 16 to 18, .2 in. long, inserted in 2 rows on the top of the tube above a short ring of tawny hairs; filaments .125 in. long, slender; anthers ovate, .075 in. long, apiculate, extrorse. *Ovary* cylindrical, style .5 in. long, surmounted by a minute rounded stigma. *Fruit* unknown.

PERAK: *King's Collector* 2680. SINGAPORE: *Ridley* 6498 (?).

This species comes very near to *B. Braceana*, but the anthers differ so much that we hesitate to join them.

13. *BASSIA CUPREA*, King & Gamble, n. sp. A tree reaching 60 to 70 feet in height; branchlets thick, brown, uppermost somewhat angular. *Leaves* coriaceous; oblong, obtuse or emarginate at apex, attenuate at base and somewhat unequal; glabrous above, sparsely hairy on the nerves beneath, otherwise glabrous; 4.5 to 6 in. long, 2.5 to 3 in. broad; of a coppery-brown colour when dry; midrib very thick and prominent; main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin; reticulations visible but not strong; petiole thick, .75 to 1 in. long, bordered above by the decurrent margin of the blade. *Flowers* fasciculate in the axils of the leaves or of the scars of fallen leaves, 2 to 5 or more in a fascicle, fragrant; pedicels .5 in. long, pubescent; buds conical, .3 in. long. *Calyx-lobes* 4, .25 in. long; 2 outer valvate, broadly ovate, shortly pubescent; 2 inner rounded concave, shallowly emarginate, ciliate and scarious on the margins, pubescent without. *Corolla* .4 in. long; tube funnel-shaped, .1 in. long, mouth densely brown-hirsute; lobes 8-9, erect or spreading, .3 in. long, oblong, rounded at apex, long brown-silky-pubescent on back, strigosely hairy within. *Stamens* 18 to 22, inserted on the mouth of the tube; filaments hairy, .05 in. long; anthers ovate-acuminate, .15 in. long, the connective produced in a long usually curved acumen, strigosely hirsute. *Ovary* oblong, glabrous, 8-10-celled, ending in a style .5 in. long surmounted by a minutely 9-10-lobed flat stigma. *Fruit* not seen.

PERAK: *Scortechini* 1879.

This species comes near to *B. Motleyana*, Clarke, but the flowers are much larger and different.

14. *BASSIA MOTLEYANA*, Clarke in Hook. f. Fl. Br. Ind. III. 546 (1882). An erect lofty tree of swampy places; branchlets dark brown, marked by prominent leaf-scars. *Leaves* coriaceous; elliptic, shortly and abruptly acuminate at apex, cuneate at base, the two sides sometimes unequal; glabrous on both surfaces; 4 to 5 in. long, 1·5 to 2·5 in. broad; midrib prominent, raised above; main-nerves 10 to 12 pairs, irregularly spaced, generally at about an angle of 60° with the midrib, meeting near the margin in a looped intramarginal nerve; secondary nerves prominent, similar to the main-nerves, reticulations few; petiole ·8 to 1·2 in. long, rather thick, bordered by the decurrent margins of the blade. *Flowers* fascicled, many together (10 to 12), in the axils of the leaves or of the scars of fallen leaves below the terminal tuft, often fully clothing the branchlets for a distance of 6 in. or more; pedicels slender, ·4 to ·7 in. long, buds ovoid. *Calyx-lobes* 4, ·15 to ·2 in. long, ovate, obtuse or somewhat acute, sparsely pubescent, the inner pair somewhat scarious on the margins. *Corolla* campanulate, ·15 to ·2 in. long; tube short, about  $\frac{1}{3}$  of the whole; lobes 8, 4 outer enclosing 4 inner, oblong-spathulate, obtuse at tip and ciliate ferruginous-pubescent. *Stamens* 16, inserted on the top of the tube on a ring of long ferruginous hairs; filaments short, slender; anthers ovate-lanceolate, short-apiculate. *Ovary* rounded, villous, 6-8-celled; style ·5 in. long, thick, sparsely pubescent. *Fruit* an obovoid glabrous berry, acute at top and furnished with the remains of the persistent style; calyx-lobes also persistent; ·5 in. long, ·3 in. broad, 1-2-seeded. *Seeds* oblong, acute at both ends; testa crustaceous, shining; albumen none; cotyledons fleshy; radicle small. Burck in Ann. Jard. Buit. V. 44. *Isonandra Motleyana*, de Vriese in Miq. Journ. Bot. Neerl. I. (1861) 257.

MALACCA: *Griffith* (K.D.) 3608; *Derry* 1026. JOHORE: *Ridley* 6496. SINGAPORE: *Ridley* 5645, 5896.—DISTRIB. Borneo (*vide* Burck).

De Vriese says the milky juice gives a gutta of bad quality, being more waxy and fragile than that of other kinds.

VAR. *Scortechinii*, King & Gamble. *Leaves* much larger, 6 to 8 in. long, 2·5 to 3·5 in. broad, main-nerves 15 or 16 pairs. *Fruit* nearly globose—a dark green berry, shining when dry.

PERAK: *Scortechinii*, at Port Weld, No. 1550; *King's Collector* 5454, 6735, on low, wet ground—a tree reaching 60 to 80 feet in height and 15 to 20 in. in diam.

15. *BASSIA CUNEATA*, Bl. Bijdr. 675. A tree (?); branchlets dark brown, scarred, rather thick. *Leaves* coriaceous; clustered at the ends of the branchlets, greenish-brown when dry, obovate, obtuse-emarginate or very shortly and abruptly acute at apex, cuneate at base;

glabrous, margins slightly recurved; 4 to 5 in. long, 2 to 3 in. broad; midrib stout, prominent, impressed above; main-nerves not prominent, about 20 pairs, nearly at right angles to the midrib, anastomosing near the margin with the secondary nerves; reticulations transverse; petiole .6 to 1 in. long, bordered by the decurrent margins of the blade. *Flowers* in axillary fascicles as long as the petiole, not seen. *Fruit* a globose berry .75 to 1 in. in diam., 1-3-seeded. *Seeds* .5 to .7 in. long, .5 in. broad and thick, ovoid, not compressed, pointed at both ends; testa crustaceous, chestnut-brown, shining; hilum very broad (.4 in.); albumen none; cotyledons fleshy, semi-ellipsoidal. Miq. Fl. Ind. Bat. II. 1041; A. DC. Prod. VIII. 199; Clarke in Hook. f. Fl. Br. Ind. III. 546; Koord. & Val. Bijdr. I. 154.

MALACCA: *Maingay* (K.D.) 986. SINGAPORE: *Ridley* 6502.—  
DISTRIB. Java.

16. *BASSIA PENANGIANA*, King & Gamble, n. sp. A tree (?); branchlets dark grey. *Leaves* chartaceous; oblong-lanceolate, acutely attenuate at both ends; glabrous, greyish-green when dry; 5 to 7 in. long, 1.5 to 2.5 in. broad; midrib broad, conspicuous, impressed above and then keeled; main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib and curved upwards to and along the margin; reticulations transverse, raised above; petiole 1 to 1.2 in. long, bordered by the decurrent margins of the blade, swollen at base; stipules very small, ovate, pubescent, caducous. *Flowers* in fascicles of about 5 to 6 in the axils of the leaves; pedicels slender, .4 to .5 in. long, appressed rusty-pubescent. *Calyx-lobes* 4, ovate, obtusely acuminate, recurved, .2 in. long, lower half thick, wrinkled, upper half thinner, somewhat scarious, sparsely appressed golden-pubescent. *Corolla* tubular-campanulate, .25 in. long; lobes 8 (?), oblong-spathulate, glabrous within, golden-pubescent without; tube rather shorter than lobes. *Stamens* 16 (?), inserted in a ring of hairs on the top of the tube; filaments slender; anthers linear-oblong, hirsute, the connective produced in a rather long, somewhat blunt, penicillate mucro. *Ovary* conical, glabrous; style slender, .3 in. long; cells 8.

PENANG: *Curtis* 1450.

17. *BASSIA ERYTHROPHYLLA*, King & Gamble, n. sp. A tree, 40 to 50 feet in height and 1 foot in diam.; branchlets thick, grey, marked with the scars of fallen leaves and the tubercles of fallen flowers. *Leaves* coriaceous; obovate-oblong, shortly and bluntly acuminate at apex, unequally attenuate at base; glabrous, orange-red when dry, margins slightly recurved; 6 to 8 in. long, 1.5 to 2.5 in. broad; midrib thick, prominent below, impressed above; main-nerves 10 to 12 pairs, rather irregular, starting at an angle of 60° from the midrib and



curved upwards to and along the margin; reticulations transverse, prominent, raised beneath; petiole 1·5 to 2 in. long, thickened at base, bordered above by the decurrent margins of the blade, younger ones golden-pubescent; stipules linear-subulate, ·3 to ·4 in. long, quickly caducous. *Flowers* fascicled, about 5 to 6 together, on raised tubercles above the scars of fallen leaves on year-old wood; pedicels in fruit thick, ·5 to ·6 in. long, golden-pubescent. *Calyx-lobes* 4, in fruit ovate-acute or rounded, densely golden-pubescent on both surfaces, thick; rest unknown. *Fruit* a globose, golden-pubescent, berry somewhat depressed at top and bearing the remains of the persistent style, ·5 to ·6 in. in diam. *Seed* not seen.

PENANG: at Highlands, *Curtis* 3652 (Kew) or 5652 (Calc.).

#### 7. PALAQUIUM, Blanco.

Trees, often of great size and containing a milky juice. *Leaves* usually coriaceous, obovate or oblong, petioled, entire, sometimes covered beneath with a dense silky or tawny pubescence. *Flowers* fasciculate, in the axils of the leaves or of the scars of fallen leaves, pedicellate. *Calyx* of 6 lobes, the outer 3 valvate, the inner 3 imbricate. *Corolla* usually campanulate, tube short; lobes 6, imbricate, often contorted in bud. *Stamens* 12 or more (up to 18), opposite to and alternate with the corolla-lobes, those alternate often shorter and sometimes inserted higher up the tube; anthers ovate-lanceolate, dehiscence extrorse, connective produced; staminodes none. *Ovary* villous, 6-celled; style subulate. *Fruit* a fleshy, ovoid or ellipsoid, berry, 1-2-seeded. *Seeds* large, exalbuminous; the testa crustaceous; cotyledons thick, fleshy; radicle pointed, inferior.—DISTRIB. About 50 to 60 species, found in South India, Ceylon, Eastern Bengal, Burma, the Malay Peninsula and Archipelago, the Philippines, and Samoa (1 sp.). *DICHOPSIS*, Thw. in. Gen. Pl. II. 658.

Pedicels never over ·75 in. long, distributed for some distance down the upper branchlets:—

Leaves large, 5 to 12 in. long, obovate-obtuse; branchlets stout, nearly ·5 in. thick:—

Leaves nearly glabrous and glaucescent beneath, main-nerves distant, irregular .. .. 1. *P. obovatum*.

Leaves ferruginous-pubescent or tomentose beneath, main-nerves fairly close and regular:—

Leaves appressed-pubescent beneath, midrib glabrous on upper surface .. .. 2. *P. Maingayi*.

Leaves spreading-tomentose beneath, midrib hairy on upper surface .. .. 3. *P. Clarkeianum*.

Leaves rarely over 6 in. long, branchlets rarely ·25 in. thick:—

Leaves always more or less obovate:—

- Leaves golden-silky-pubescent beneath :—  
 Main-nerves close, over 20 pairs .. .. 4. *P. Gutta*.  
 Main-nerves about  $\frac{1}{2}$  in. apart, under 20 pairs .. 5. *P. Oxleyanum*.  
 Leaves not or only very slightly silky-pubescent beneath :—  
 Leaves conspicuously red or yellow when dry .. 6. *P. xanthochymum*.  
 Leaves not conspicuously red or yellow when dry, usually brown or greenish-brown :—  
 Leaves over 3 in. long .. .. 7. *P. bancanum*.  
 Leaves 2 to 3 in. long .. .. 8. *P. Ridleyi*.  
 Leaves under 2 in. long .. .. 9. *P. microphyllum*.  
 Leaves elliptic, not obovate :—  
 Produced connective of anthers bifid at point; leaves glabrous .. .. 10. *P. hexandrum*.  
 Produced connective of anthers simple at point; leaves grey-pubescent beneath .. .. 11. *P. Herveyi*.  
 Pedicels 1 in. long or longer, clustered only at the extreme ends of the branchlets; leaves oblong-lanceolate, 3-6 in. long .. 12. *P. stellatum*.

1. *PALAEQUIM OBOVATUM*, King & Gamble. A big tree with a foxy odour (Ridley), evergreen; the branches thick, brown, marked by the very prominent scars of fallen leaves; leaves clustered towards the ends of the branchlets; innovations rusty-pubescent. *Leaves* coriaceous; obovate-cuneate or obovate-oblong, obtuse or very shortly acute at apex, cuneate at base; recurved and somewhat undulate on the margins; glabrous above, glaucescent beneath; 5 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, impressed above, much raised beneath; main-nerves about 12 pairs, at an angle of 40° to 45° with the midrib, inconspicuous above, raised and prominent beneath; reticulations many, oblique, obscure; petiole thick, 7 to 1 in. long, bordered above by the decurrent margins of the blade, glabrescent or slightly rusty-pubescent. *Flowers* in clusters in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels 3 to 5 together, 3 to 5 in. long, rusty-pubescent; buds at first globose, afterwards elongate by the growth of the corolla. *Calyx-lobes* 6; outer 3 triangular-ovate, thick, pubescent outside, 15 in. long; inner 3 imbricate, ovate-obtuse, 1 in. long, margins scarious. *Corolla* campanulate; tube very short; lobes 6, imbricate and twisted, 4 to 5 in. long, glabrous without, slightly pubescent within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the lobes of the corolla, ovate lanceolate, apiculate, thickly rusty-villous; filaments as long as anthers, slender, glabrous. *Ovary* globose; style 5 in. long, subulate, glabrous. *Fruit* a globose berry, 75 to 1 in. in diam., pulp fleshy, seeds 1 to 2. *Seed* ovoid, scarcely flattened on one side, pointed at base; testa thin, shining; albumen none, cotyledons fleshy. *Dichopsis obovata*, Clarke in Hook. f. Fl. Br. Ind. iii. 542. *Isonandra obovata*, Griff. Notul. iv. 293; Kurz

For. Fl. II. 120 and Journ. As. Soc. Beng. XLVI. ii. 230. *Bassia?* *hypoleuca*, Miq. Fl. Ind. Bat. Suppl. 582 (*vide* Kurz).

PENANG: *Holmberg* 783. MALACCA: *Griffith* (K.D.) 3606; *Maingay* (K.D.) 995, 996; *Curtis* 3480, 3481, 3482; *Hervey* 2754; *Derry* 59, 88; *Ridley* 10079; *Goodenough* 1994. SINGAPORE: *T. Anderson* 122; *Ridley*.  
—DISTRIB. Tenasserim, Sumatra.

Curtis says it gives a low class bastard gutta of little value. Vern. "Niato bunga" "Niato tunbaga" "Niato balam."

2. *PALAQUIUM MAINGAYI*, King & Gamble. A tree; stems reaching 60 feet in height and 10 to 15 in. in diam.; branchlets dark brown, rough, about .4 in. in diam., marked by the large scars of fallen leaves; innovations densely short-rusty-pubescent. *Leaves* chartaceous; obovate, obtuse at apex, cuneate or slightly rounded and more or less auricled at base; margins recurved; glabrous above except on midrib, thickly ferruginous-pubescent beneath; 5 to 13 in. long, 3 to 7 in. broad; midrib stout, impressed above, prominent beneath, main-nerves 12 to 20 pairs, .5 to .8 in. apart, starting at an angle of about 55° with the midrib, parallel to near the margin and then curving upwards to join in a marginal nerve; reticulations not prominent, obliquely joining the main-nerves; petiole 1 to 1.5 in. long, thickly rusty-pubescent, channelled above by the decurrent margins of the blade; stipules subulate falcate, .5 in. long, very caducous. *Flowers* fasciculate, up to 10 together, in the axils of the leaves or of the scars of fallen leaves; pedicels .5 to .7 in. long, rusty-pubescent. *Calyx*-lobes 6; outer 3 valvate, ovate, densely pubescent, .15 in. long; inner 3 imbricate, orbicular, depressed at top, scarious and ciliate on the margins, .15 in. long. *Corolla* campanulate; tube short (.1 in.); lobes 6, imbricate, overlapping to the right, ovate-oblong, glabrous, .25 to .35 in. long. *Stamens* 12, .25 in. long, opposite to and alternate with corolla-lobes; anthers ovate, apiculate, slightly rusty-hirsute behind; filaments as long as anthers, slender. *Ovary* rounded; style .2 to .4 in. long, subulate; cells 6. *Fruit* a shining, green, fleshy berry, about .5 in. long, supported by the persistent calyx. *Seeds* 2, oblong; testa dark brown, crustaceous; albumen none. *Dichopsis Maingayi*, Clarke in Hook. f. Fl. Ind. III. 543.

PERAK: *Wray* 524, 553, 2215, up to 2,000 feet; *King's Collector* 6644. MALACCA: *Maingay* (K.D.) 996/2; *Hervey*.

*P. Ottolanderi*, Koord. & Val. of Java is near this species, but is readily distinguished by its larger flowers and long pointed fruit.

3. *PALAQUIUM CLARKEANUM*, King & Gamble. A large tree, with thick rough bark and spreading branches, reaching 100 to 150 feet in

height and 2 to 4 feet in diam. of stem; branchlets stout, uppermost .5 in. in diam., prominently pitted with the scars of fallen leaves, densely ferruginous-tomentose. *Leaves* chartaceous; obovate, obtuse at apex, cuneate at base; glabrous above except on the midrib which is strongly pubescent, densely ferruginous-tomentose beneath; margins recurved; 8 to 10 in. long, 4 to 5 in. broad; midrib very thick; main-nerves 18 to 22 pairs, rather irregular, starting at about 70° to 80° with the midrib, straight at first then arching at and along the margin, impressed above; reticulations obliquely transverse, prominent; petiole .7 to 1 in. long, thick, densely ferruginous-tomentose, enlarged at base. *Flowers* not seen. *Fruit* an oblong, glossy, bright green berry, 2 in. long, 1-seeded. *Seed* oblong, acute at both ends, rounded on the back, flattened at the hilum, 1.2 in. long, .5 in. broad; testa thin, chartaceous, shining, chestnut-brown; hilum oblong; cotyledons oblong, fleshy. *Dichopsis Clarkeana*, Brace MS. in Herb. Calc.

PERAK: at Waterfall Hill, 600 feet, *Wray* 530; on open hills near Larut at 500 to 1,000 feet, *King's Collector* 3796.

*Wray* says the gutta it gives is not enough in quantity to be worth extraction. The tree is evidently closely allied to *P. Maingayi*, and might almost be made a variety of that species.

4. *PALAEQUIM GUTTA*, Burck in Ann. Jard. Buit. V. 24, t. IV. (1885). A large evergreen tree; branchlets rough, prominently marked with the scars of fallen leaves and with longitudinal wrinkles; innovations minutely ferruginous-pubescent. *Leaves* coriaceous; obovate or obovate-oblong, abruptly and usually shortly acuminate at apex rarely rounded, cuneate at base; margins slightly recurved; glabrous above, densely appressed-golden-silky-pubescent beneath especially when young, when old glabrescent; 3 to 5 in. long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves 24 to 30 pairs, indistinct, starting at rather more than 60° with the midrib, parallel and arching only close to the margin; secondary nerves and reticulations inconspicuous, the latter very oblique; petiole 1 to 1.5 in. long, slender, grooved above, slightly thickened at base, appressed-golden-pubescent. *Flowers* in fascicles of about 4 to 5, in the axils of the leaves or of the scars of fallen leaves on the previous year's wood; pedicels thick, .1 to .2 in. long, somewhat angular, densely golden-pubescent. *Calyx-lobes* 6; 3 outer valvate, triangular-ovate, .3 in. long; 3 inner imbricate, rather longer and more acute, golden-pubescent without. *Corolla* rotate-campanulate; tube shorter than the calyx; lobes 6, ovate, obtuse, imbricate and twisted at first, afterwards spreading, .25 in. long, glabrous. *Stamens* 12, opposite to



and alternate with the corolla-lobes, inserted at the top of the tube; filaments equal, slender, 1 in. long; anthers shorter than the filaments, ovate, extrorse, the connective produced in a broad point. *Ovary* sub-globose, slightly pubescent, 6-celled; ovules oblong, one in each cell; style 4 to 5 in. long, filiform; stigma obtuse. *Fruit* a 1-2-seeded berry, 6 to 7 in. in diam., ovoid, acute at top; pulp very glutinous, hard. *Seeds* oblong, rounded at the ends; hilum very large, elliptic, occupying about one-half of the surface; testa shining. Pierre in Bull. Soc. Linn. Par. I. 498; Engl. & Prantl Pflanzenfam. IV. i. 135, fig. 71; Baill. Hist. des Pl. XI. fig. 296. *Dichopsis Gutta*, Benth. in Gen. Pl. II. 658; Clarke in Hook. f. Fl. Br. Ind. III. 543. *Isonandra Gutta*, Hook. Lond. Journ. Bot. VI. 463 t. 16; Walp. Ann. i. 496; Miq. Fl. Ind. Bat. II. 1038 t. XXXVI.; Benth. & Trim. Med. Pl. t. 167.

PENANG: *Curtis* 780, 3535, 3582, 3633, 3635. PERAK: *Wray* 522. MALACCA: *Maingay* (K.D.) 983. DINDINGS: *Hallifax* (*Curtis* 3639). SINGAPORE: *Lobb* 290; *Ridley* 9519, 11320.

The true guttapercha tree, perhaps the most valuable of all the trees of the Peninsula. It gives the "Taban" Gutta or "Taban Merah." It has become very scarce in a wild state, but is now being much planted, so perhaps it may soon again become common (see also H. C. Hill, Reports on Forest Conservancy in the Straits Settlements and the Federated Malay States, and Burn-Murdoch in "Indian Forester," XXXI. 309, "Some Facts about Gutta Percha.") *Ridley*, in Trans. Linn. Soc. III. (1893), 317, says the tree was seen by him in several places in the Tahan woods, and that a considerable amount of guttapercha is collected there.

VAR. *oblongifolia*. A large tree; stem reaching 80 feet in height and up to 2 feet in diam. *Leaves* larger than in the typical form, obovate-oblong or lanceolate-oblong; longer, abruptly acuminate, reaching 7 in. in length and 3 in. in breadth, rather more conspicuously golden-pubescent. *Flowers* similar but a little larger, pedicels a little shorter. *Fruit* rather larger, less acute at top. *P. oblongifolium*, Burck in Ann. Jard. Bot. Buit. V. 25 tab. V. *Isonandra Gutta* var. *oblongifolia*, de Vriese, Tuinbouw Flora (1856), III. 226. *Isonandra Gutta*, var.  $\beta$ . *sumatrana*, Miq. Fl. Ind. Bat. II. 1038, and Suppl. 581.

PERAK: *Curtis* 3637, 3725; *Wray* 535; *Murton*; *King's Collector* 6475. JOHORE: *Curtis* 3632—in open forest in the hills at 500 to 1,000 feet.—DISTRIB. Sumatra, Borneo. Gives guttapercha like the type.

We are unable to find sufficient characters for separating this, as a species, from *P. Gutta*, as is done by Burck. The specimens available seem to point to a regular series of intermediates, so that it can scarcely be even maintained as a variety. It is possible that *P. malaccense* and *P. formosum*, Pierre in Bull. Soc. Linn. Par. I. 498, are both forms of *P. Gutta*, but we have seen no specimens. Beccari in "Nelle

Foreste di Borneo," p. 558, suggests the identity of the latter species with *P. oblongifolium*.

5. *PALAEQUIM OXLEYANUM*, Pierre in Bull. Soc. Linn. Par. I. 498 (1885), *non* Burck. A large tree; branchlets dark brown, marked by prominent scars of fallen leaves; innovations minutely ferruginous-pubescent. *Leaves* coriaceous; oblong-obovate, abruptly and shortly acuminate at apex, cuneately attenuate at base; glabrous above, densely appressed-golden-pubescent beneath, finally glabrate, margins recurved; 5 to 8 in. long, 2.5 to 3 in. broad; midrib prominent, thick, impressed above; main-nerves 14 to 18 pairs, irregular, sometimes branched, .4 to .5 in. apart, starting at an angle of about 60° with the midrib, curved near the margin to meet in a rather faint looped intramarginal nerve; secondary nerves few; reticulations few, horizontally transverse; petiole 1 to 1.5 in. long, somewhat thickened at base, minutely rusty-pubescent, channelled above and bordered for some distance by the decurrent margins of the blade; stipules minute, falcate, caducous. *Calyx-lobes* 6; 3 outer rather thicker than 3 inner, ovate, sub-acute, densely ferruginous-pubescent, .25 in. long. *Fruit* a nearly globose berry, 1 in. long and about .75 in. in diam. *Seeds* oblong; testa shining, crustaceous. *Dichopsis pustulata*, Hemsl. in *Herb. Kew*.

PENANG: *Curtis* 3582. PERAK: *Curtis* 3631, 3638, 3724—on the hills up to 2,500 feet; *Wray* 511 (*part*), 590; *Douglas*; *Phillips*. SELANGOR: *Curtis* 3763, 3764. SINGAPORE: *Maingay* (K.D.) 983 (the No. 1948 quoted by Pierre); *Jas. Collins* (a pustulate form apparently diseased).

This species gives apparently the "taban sutra" or "taban putih" guttapercha, which is not one of the best quality.

VAR. *glabrata* King & Gamble. *Leaves* smaller, about 1.5 in. broad, glabrate beneath, rarely slightly golden-pubescent; *fruit* oblong; *branchlets* grey, very rough with scars of fallen leaves and flowers.

PERAK: *Wray* 511 (*part*), 518.

*P. Oxleyanum*, Burck Ann. Jard. Buit. v. (1886) 33, is a different plant altogether (see *Teysmann's* specimen in *Herb. Kew*).

6. *PALAEQUIM XANTHOCHYUM*, Pierre ex Burck in Ann. Jard. Buit. V. 30 (1885). A large handsome tree; the stem reaching 80 to 120 feet in height and 2.5 to 3 feet in diam.; branchlets dark brown, innovations rusty-pubescent; leaf-bud scales lanceolate, ciliate, about .1 in. long. *Leaves* coriaceous, glossy-green; obovate, obtuse and often emarginate at apex, cuneate at base; glabrous on both surfaces, margin recurved, reddish when dry; 2.5 to 4 in. long, 1.5 in. broad; midrib prominent,

impressed above; main-nerves obscure, about 12 to 14 pairs at about 60° with the midrib; reticulations scarcely visible; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade; stipules ovate, ciliate, very small, caducous. *Flowers* fascicled, up to 8 together, in the axils of the leaves or of the scars below them; pedicels slender, recurved, .2 in. long; buds very small, conical. *Calyx-lobes* 6, .1 in. long; 3 outer valvate, 3 inner imbricate, ovate-acute, rusty-pubescent. *Corolla* campanulate, .3 in. long, tube short; lobes 6, imbricate, oblong, blunt. *Stamens* 12, inserted on the top of the tube; filaments stout, curved; anthers ovate-sagittate, mucronate, extrorse. *Ovary* rounded, glabrous; style .1 in. long, subulate. *Fruit* an ovoid berry, glabrous. *Isonandra xanthochyma*, de Vriese Nat. Tijdschr. Ned. Ind. XXI. 311, and Miq. Journ. Bot. Neerl. i. 259. *Dichopsis rubens*, Clarke in Hook. f. Fl. Br. Ind. III. 543.

PERAK: *King's Collector* 7288—on low ground and rich soil. MALACCA: *Maingay* (K.D.) 995. SINGAPORE: *Cantley* 63; *Ridley* 3774. —DISTRIB. Borneo.

Produces a guttapercha of a yellowish colour and second quality (de Vriese).

7. *PALAEQUIM BANCANUM*, Burck in Ann. Jard. Buit. V. 43 (1885). A very large evergreen tree; stems reaching 80 to 100 feet (Curtis), 100 to 120 feet (Kunstler) in height, with a girth of 10 to 12 feet; branchlets rough, prominently marked with the scars of fallen leaves, upper branchlets and innovations slightly but minutely rusty-pubescent. *Leaves* coriaceous; clustered at the ends of the branchlets, obovate or obovate-oblong, abruptly and very shortly acute at the otherwise rounded apex, cuneate at base; margins slightly recurved; glabrous on both surfaces, the lower with very minute glandular scales; 3 to 4 in. long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves very obscure, about 14 to 16 pairs, inclined at nearly 70° to midrib and at first parallel, afterwards arching, reticulations very faint; petiole .7 to 1 in. long, edged above with the decurrent margins of the blade, glabrous. *Flowers* fasciculate, clustered about 2 to 4 together in the axils of the leaves or of the scars of fallen leaves, often on a length of as much as 4 to 5 in. of the branchlet; pedicels and calyx minutely ferruginous-pubescent; pedicels .1 to .15 in. long, thick. *Calyx-lobes* 6, the 3 outer valvate rounded, the 3 inner imbricate acute, .15 to .2 in. long. *Corolla* campanulate, tube as long as calyx; lobes 6, ovate, spreading, as long as tube, glabrous except a slight rusty pubescence within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the corolla-lobes; filaments inserted on the top of the tube, slender; anthers ovate, apiculate, extrorse. *Ovary* flattened-

cylindrical, the top rusty-hirsute; style as long as corolla, subulate, glabrous; cells 6. *Fruit* a fleshy oblong or obovate berry, smooth, .75 in. long, .5 in. thick, 1-seeded.

PENANG: *Curtis* 3583, 3659. PERAK: *Wray* 3984; *King's Collector* 6506, 6509. SINGAPORE: *Ridley* 6019, 6134, 6502, 6507; *Fox* 11307 at Bukit Timah; *Cantley* 73.—DISTRIB. Bangka.

Said to give a kind of "guttapercha."

8. *PALAEQUIMUM RIDLEYI*, King & Gamble, n. sp. A tree (?); branchlets blackish-grey, rough, innovations minutely rusty-pubescent. *Leaves* chartaceous-coriaceous; elliptic or elliptic-obovate, obtuse, emarginate or slightly acute at apex, cuneate at base; glabrous on both surfaces, margins slightly recurved; 2 to 3 in. long, 1 to 2 in. broad; midrib broad; main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin, .2 to .3 in. apart; reticulations many, transverse, impressed above; petiole .5 to .7 in. long flattened and bordered by the decurrent broad margins of the blade; stipules small, ovate, hirsute, caducous. *Flowers* small, fascicled in groups of 6 or 7 together in the axils of the uppermost leaves; pedicels rather thick, about .25 in. long, sparsely appressed-pubescent. *Calyx-lobes* 6, .1 in. long; 3 outer rounded, shortly mucronate, glabrous, wrinkled when dry; 3 inner thin, scarious on the margins, ciliate, rusty-pubescent on both sides. *Corolla* tubular-campanulate, .15 in. long, glabrous; lobes 6, oblong, obtuse, erose at tip; tube as long as lobes. *Stamens* 12, inserted on the top of the tube opposite to and alternate with the lobes; filaments slender as long as the lobes; anthers ovate-acute. *Ovary* conical, glabrous below, villous above, surmounted by a conical thick style, .05 in. long, 6-celled. *Fruit* not seen.

SINGAPORE: *Ridley* 3591A.

9. *PALAEQUIMUM MICROPHYLLUM*, King & Gamble, n. sp. A tree (?); branchlets rounded, rough, dotted with scars of fallen leaves and flowers; innovations dark ferruginous-pubescent. *Leaves* coriaceous; obovate, obtuse or slightly obtusely-acute at apex, cuneate at base; glabrous on both surfaces, margins recurved; 1 to 2 in. long, .7 to 1 in. broad; midrib slender, impressed above; main-nerves indistinct, about 8 to 10 pairs, nearly at right angles to the midrib; reticulations very faint even when dry; petiole .4 to .5 in. long, bordered above by the decurrent margins of the blade. *Flowers* fascicled, 1 to 3 together, above the scars of fallen leaves on the past year's wood; pedicels .2 in. long, rusty-pubescent. *Calyx-lobes* 6; outer 3 valvate, ovate-acute, .15 to .2 in. long, densely tawny-pubescent; inner 3 imbricate, ovate,



blunt, scarious and ciliate on the margins, tawny-pubescent on the back, .1 to .15 in. long. *Corolla* tubular-rotate; the tube very short, scarcely .05 in. long; the 6 lobes oblong or nearly spatulate, .1 to .15 in. long, reflexed in flower, sparsely hairy without. *Stamens* 12, filaments slender, recurved; anthers ovate, .075 in. long, bi-mucronate. *Ovary* tawny-villous, conical; style .15 to .2 in. long, straight; cells 6. *Fruit* not seen.

SINGAPORE: at Bukit Timah, *Ridley* 10840.

10. *PALAEQUIM HEXANDRUM*, King & Gamble. A tree; branchlets light brown, innovations ferruginous-pubescent. *Leaves* chartaceous, glabrous; elliptic-oblong, shortly and bluntly acute at apex, attenuate and more or less unequal at base; 4 to 5 in. long, 2 to 2.5 in. broad; midrib thick, prominent; main-nerves 10 to 13 pairs, starting at about 65° to midrib then arched upwards, reticulations obscure. *Flowers* fasciculate, 3 to 4 together in the axils of the leaves or the scars of fallen leaves; pedicels slender, .4 in. long, minutely pubescent. *Calyx-lobes* 6; 3 outer valvate, 3 inner more or less imbricate, pubescent outside, ciliate, .05 to .07 in. long, apex scarcely acute. *Corolla* campanulate; tube .1 in. with a ring of hairs near the mouth inside; lobes 6, imbricate, .15 in. long, oblong obtuse, spreading. *Stamens* 12, inserted on the top of the tube, 6 opposite to and 6 alternate with the lobes, the alternate ones shorter; filaments slender; anthers exsert, ovate-lanceolate, bi-mucronate, as long as filaments. *Ovary* rounded, thickly rusty-pubescent; style subulate, .25 in. long. *Fruit* a fleshy berry, about .75 in. in diam., smooth, 1-seeded. *Seed* ovoid, .7 in. long, .5 in. broad, scarcely flattened; testa thin, brown, shining; hilum very large, occupying about one-half of the seed; albumen none. *Dichopsis hexandra*, Clarke in Hook. f. Fl. Br. Ind. iii. 543. *Isonandra hexandra*, Griff. Notul. IV. 292. *Payena Griffithii*, Kurz For. Fl. II. 121, and Journ. As. Soc. Beng. XLVI. ii. 230 (*vide* Clarke, but with doubt).

MALACCA: *Griffith* (K.D.) 3609; *Maingay* (K.D.) 984. SINGAPORE: *Ridley* 11373.—DISTRIB. Burma (?)

11. *PALAEQUIM HERVEYI*, King & Gamble, n. sp. A large tree; branchlets rather stout, dark brown; innovations minutely rusty-pubescent; leaf-bud scales lanceolate, .15 in. *Leaves* chartaceo-coriaceous; elliptic or elliptic-obovate, very shortly acute or sometimes emarginate at apex, cuneately attenuate often unequally at base; glabrous above except on midrib and nerves, sparsely rusty-pubescent beneath, afterwards glabrate, cinereous when dry; 2 to 3.5 in. long, 1.25 to 1.75 in. broad; midrib prominent; main-nerves 5 to 7 pairs at about 45° with the midrib and arching upwards, reticulations obscure; petiole .5 in. long

bordered above by the decurrent margins of the blade, rusty-pubescent. *Flowers* small, fascicled 4 to 6 together in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels .3 in. long, slender, decurved, pubescent; buds very small, globose. *Calyx* 6-lobed, 3 outer valvate, and 3 inner imbricate, .1 in. long, lobes ovate acute, pubescent. *Corolla* campanulate; tube short, rusty-hirsute without; lobes 6, oblong-linear, recurved in flower, hairy within at the base, .15 in. long, imbricate. *Stamens* 12; filaments long, exsert; anthers ovate, mucronate, extrorse, as long as filaments, hirsute. *Ovary* subglobose, rusty-pubescent, 6-celled; style slender, .3 in. long; stigma capitate. *Fruit* not seen.

PERAK: *Wray* 1104. MALACCA: *Maingay* (K.D.) 995; *Scortechini* 1892; *Hervey*. Vern. "Jongek" (Hervey).

*Wray* says the gutta is sticky and worthless.

12. *PALAQUITUM STELLATUM*, King & Gamble. A large tree, stems reaching over 100 feet in height; branchlets rather thick, dark brown, rough with the scars of fallen leaves; innovations ferruginous-pubescent. *Leaves* membrano-chartaceous, clustered at the ends of the branchlets; oblong-lanceolate, shortly acuminate at apex, cuneate at base; nearly glabrous above, pale and when young tomentose beneath, rusty-stellate-tomentose (*Scortechini*) on the nerves on both sides; 3 to 6 in. long, 1 to 1.5 in. broad; midrib prominent; main-nerves 10 pairs, starting at about 60° with the midrib and at once curving upwards; reticulations prominent on both sides in an elegant network; petiole .75 to 1 in. long, slender, densely rusty-pubescent. *Flowers* fasciculate, 3 to 5 together in the axils of the upper leaves, forming almost a terminal leafy corymb of about 20 to 25 flowers; pedicels slender, about 1 in. long, densely rusty-pubescent. *Calyx-lobes* 6, densely rusty-pubescent, in 2 series; the outer of 3 valvate, ovate, rounded lobes, the inner of 3 ovate ciliate lobes with scarious margins; both .25 to .3 in. long. *Corolla* campanulate, .3 to .4 in. long, the tube a little shorter than the lobes; the lobes imbricate, twisted in bud, rounded at top, glabrous. *Stamens* 12 in one series; filaments on the base of the tube and attached to it, free above, .2 in. long, thickened below, slender above; anthers oblong-lanceolate, apiculate, extrorse, .1 in. long, glabrous. *Ovary* rusty-pubescent, sub-globose; style slender, .35 in. long; cells 6 (?). *Fruit* not seen. *Dichopsis stellata*, *Scortechini* MS. in Herb. Calc.

PERAK: *Scortechini*, 1855.

A very distinct species, looking very like a *Bassia*. *Scortechini* says it yields good gutta, but in small quantities.

8. *MIMUSOPS*, Linn.

Trees with milky juice. *Leaves* chartaceous or coriaceous, with many usually inconspicuous parallel main-nerves. *Flowers* solitary or fascicled in the axils of the upper leaves on the branchlets. *Calyx-lobes* 6 or 8, in 2 series, the outer valvate enclosing the inner imbricate. *Corolla* with short tube; lobes 18 or 24 or more in 2 rows, one-third of the number in the inner, the rest in the outer, row; lobes of the outer row often divided.\* *Stamens* 6 or 8, attached to the corolla-tube opposite the inner lobes; filaments short, dilated, free or connate in a tube with the staminodes; anthers lanceolate, extrorse, usually apiculate by the production of the connective. *Staminodes* alternate with and as many as the stamens, sub-petaloid, usually fimbriate. *Ovary* hirsute, 6-8-celled. *Fruit* a globose or ovate fleshy berry, epicarp crustaceous; seeds few or solitary. *Seeds* ovate or oblong, often oblique, slightly compressed; hilum basal or lateral; testa hard, shining; albumen fleshy, thin; cotyledons flat, leafy.—*DISTRIB.* Species about 30; in the tropics of both hemispheres.

Calyx-segments 8; stamens 8; staminodes acuminate, hairy	.. 1. <i>M. Elengi</i> .
Calyx-segments 6; stamens 6; staminodes fimbriate, glabrous	.. 2. <i>M. Kauki</i> .

1. *MIMUSOPS ELENGI*, Linn. Sp. Pl. 349 (1753). An evergreen tree, stems reaching 40 to 50 feet in height, and with a large girth; ultimate branchlets with dark brown rusty pubescence. *Leaves* chartaceous; elliptic, shortly acuminate at apex, rounded (often unequally), at base; glabrous on both surfaces, shining above; margins slightly recurved; 3 to 5 in. long, 1.5 to 2.5 in. broad; midrib prominent, raised on both surfaces; main-nerves numerous, the first pair from the base forming intra-marginal nerves, which are looped where they meet the 14 to 16 pairs of main-nerves; secondary nerves like the main-nerves and, with the reticulations, forming an elegant network; petiole .6 to 1 in. long, slender; stipules triangular-subulate, very small, ferruginous-pubescent, very caducous. *Flowers* white, fragrant, solitary or in fascicles of 2 to 6 in the axils of the upper leaves; pedicels .3 to .7 in. long, often deflexed, appressed-ferruginous-pubescent; buds ovoid, acute. *Calyx-lobes* 8, .3 in. long, ovate-lanceolate, acuminate; the 4 outer valvate, broader than the 4 inner imbricate and channelled on the back; all rusty-pubescent without, glabrous within. *Corolla* with a very short tube, scarcely over .05 in. long; lobes 24, in 2 rows, the 16 outer linear-lanceolate, the 8 inner rather broader and shorter, linear-oblong. *Stamens* 8,

\* The outer corolla-lobes are now usually considered to be of the character of stipules to the inner row which constitute the regular petals.

opposite the lobes of the inner row; filaments slender, .05 in. long; anthers oblong, glabrous, apiculate. *Staminodes* alternate with the anthers, oblong-lanceolate, acuminate, toothed, clothed on the back and sides with pale stiff hairs. *Ovary* silky-pubescent, 6-celled; style slender, grooved, as long as corolla. *Fruit* an ovoid berry about 1 in. long; yellow when ripe, 1- rarely 2-seeded. *Seed* oblong, .75 in. long, .5 broad and about .25 thick, rounded above, hollowed at base where is the small oval hilum; testa crustaceous, dark brown, shining; albumen thin; cotyledons oblong, leafy, nearly as large as the seed cavity; radicle inferior. Roxb. Cor. Pl. I. 15. t. 14, and Fl. Ind. II. 236; Gaertn. f. Fruct. I. 198, t. 42; Lamk. III. t. 300; Baillon Hist. Pl. XI. 267, figs. 302-309; Engl. & Prantl Pflanzenfam. IV. i. 152, fig. 82 E-J; Burck Ann. Jard. Brit. V. (1886) 61; Wall. Cat. 4146; A. DC. Prod. VIII. 202; Clarke in Hook. f. Fl. Br. Ind. III. 548; Dalz. & Gibs. Bomb. Fl. 140; Wight Ic. t. 1586; Brandis For. Fl. 293; Bedd. Fl. Sylv. t. 40; Kurz in Journ. As. Soc. Beng. XLVI. ii. 231, For. Fl. II. 123; Trimen Fl. Ceyl. III. 86; Prain Beng. Pl. 649; Cooke Fl. Bomb. II. 95. *M. obtusifolia*, Bl. Bijdr. 672. "*Elengi*" Rheedee Hort. Mal. I. 33 t. 20. Rumph. Herb. Amb. II. 189 t. 63.

PERAK: *Scortechini* 1122. MALACCA: *Griffith* (K.D.) 3612; *Maingay* (K.D.) 995/2, 998; *Cuming* 2265.—DISTRIB. India, Ceylon, Burma, cultivated in other tropical regions; the fallen corollas are used to make garlands.

2. *MIMUSOPS KAUKI*, Linn. Sp. Pl. 349 (1753). A large evergreen tree; branchlets thick greyish-brown, extremities somewhat ferruginous-scaly or -pubescent. *Leaves* coriaceous, clustered towards the ends of the branchlets; obovate or elliptic-obovate, obtuse, emarginate or very slightly acute at apex, cuneate at base; glabrous above, densely and smoothly grey-silky-pubescent beneath; the margins slightly recurved; 2 to 4 in. long, 1.25 to 2.75 in. broad; midrib prominent; main-nerves very indistinct, about 14 to 16 pairs, parallel, meeting near the edge in a looped intramarginal nerve; petiole .5 to 1.5 in. long, moderately thick, channelled above. *Flowers* thickly clustered towards the ends of the branchlets; pedicels .75 to 1 in. long, appressed grey-silky-pubescent, angular. *Calyx-lobes* 6, .25 in. long; 3 outer valvate, ovate, acute, grey-silky-pubescent; 3 inner imbricate, similar but rather thinner. *Corolla* with a very short tube and 18 (or more, exceptionally) lobes in 2 rows; the outer row 12, lanceolate, acute; the inner 6, spatulate; all .1 in. long or nearly so, glabrous. *Stamens* 6 to 8, usually 6, extrorse; filaments .1 in. long, conical, glabrous; anthers .1 in. long, linear, blunt. *Staminodes* alternating with the stamens, .2 to .25 in. long, cuneate, deeply and irregularly fimbriate at apex.



Ovary villous, ovoid, 6-celled; ovules elliptic; style exsert, .4 in. long, slender. *Fruit* an ovoid rough berry, .1 in. long, 2-4-seeded. *Seeds* obliquely obovoid, somewhat curved near the base, .6 to .7 in. long by .4 to .5 in. broad and .4 in. thick; hilum lateral towards the base, .35 in. long, linear-oblong; testa thick, crustaceous, chestnut-brown; albumen thin; cotyledons flat, leafy, oblong, .3 to .35 in. long; radicle inferior, rather large. Wall. Cat. 4149E (*upper half*); A. DC. Prod. VIII. 203; Clarke in Hook. f. Fl. Br. Ind. III. 549; Miq. Fl. Ind. Bat. II. 1042; Koord. & Val. Bijdr. I. 156; Burck in Ann. Jard. Buit. V. (1836) 64. *M. Balata*, Gaertn. f. Fruct. III. 133. *M. Balota*, Bl. Bijdr. 673. *M. Hookeri*, A. DC. Prod. VIII. 204. *M. Bojeri*, A. DC. l.c. 205 (*fide Miquel*). *M. dissecta*, R. Br. Prod. 531. *M. Browniana*, Benth. Fl. Austral. IV. 285.—Rumph. Herb. Amb. iii. 19. t. 8 *flor. exc.*

PERAK: *Scortechini*. MALACCA: *Griffith* (K.D.) 3614; *Maingay* (K.D.) 987.—DISTRIB. Amherst in Burma, *Wallich*; Malay Islands; tropical Australia—cultivated elsewhere for its edible fruit.

The following new species from the Andaman Islands seems worthy of description here.

*MIMUSOPS ANDAMANENSIS*, King & Gamble, n. sp. A tree (?); branchlets slender, grey; innovations, with inflorescence and leaf-petioles, covered with appressed pale tawny tomentum. *Leaves* coriaceous; elliptic-obovate, shortly acute at apex, cuneate at base; margins recurved; glabrous on both surfaces; 3 to 4 in. long, 2 to 3 in. broad; midrib slender; main-nerves about 15 pairs, parallel, very inconspicuous, secondary nerves similar to main-nerves, less prominent; petiole slender, .75 to 1 in. long, channelled above. *Inflorescence* of 1-3-flowered sessile umbels in the axils of the upper leaves; pedicels slender, .8 to 1 in. long, angular; buds ovoid-conical, .4 in. long. *Calyx-lobes* 8 in 2 series; outer 4 lanceolate, acuminate, valvate, reflexed when open, .4 to .5 in. long; inner 4 as long, linear-lanceolate, deeply channelled on the back, scarcely imbricate. *Corolla-lobes* 24, the inner series of 8, oblong-lanceolate, glabrous, obtuse, each bearing behind it two narrow acute, simple or deeply bifid lobes, rather shorter than and narrower than the 8 inner lobes. *Stamens* 8, opposite the inner corolla-lobes, and shorter than them; filaments slender, slightly hirsute, .075 in. long; anthers linear-sagittate, the connective produced in a long apiculus, often bifid. *Staminodes* alternate with the stamens and rather shorter than them, densely hirsute, linear-lanceolate, long acuminate, midrib black. *Ovary* rounded, 8-lobed, pubescent; style subulate, glabrous, stigma minutely cleft; cells 8, each with a narrow central ovule. *Fruit* unknown.

Hill jungle near Port Mouat, S. Andaman, *King's Collector*.

In the characters of the corolla-lobes this species seems to be intermediate between *Mimusops* and *Imbricaria*, and, since Engler has recently reduced *Imbricaria* to a section of *Mimusops*, we have no hesitation in describing it under that genus.

## Order LXXII. EBENACEÆ.

Shrubs or trees with usually hard wood. *Leaves* alternate, rarely sub-opposite, entire, usually coriaceous, ex-stipulate. *Flowers* usually diceious, regular; the females usually (and the males sometimes) solitary; the males (and the females occasionally) in short, usually bracteate, axillary or extra-axillary cymes; pedicels articulated. *Calyx* inferior, gamosepalous, campanulate or tubular, with 3 to 7 valvate, imbricate or contorted, often accrescent, lobes. *Corolla* gamopetalous, variously shaped; the lobes 3 to 7, usually contorted, sometimes imbricate or valvate in bud. *Stamens* in the ♂ and ♀ flowers in a single series, and as many as the corolla-lobes, or 2- or more-seriate and 2 or more times as many; filaments shorter than the anthers, free or in pairs, or variously connate below; anthers linear, usually with longitudinal dehiscence, the connective often apiculate; in the ♀ flowers reduced to staminodes with empty or abortive anthers, or absent. *Disk* none. *Carpels* in the ♂ flowers abortive or absent; in the ♀ or ♀ flowers connate into a sessile superior ovary, with 2 to 8 usually more or less united styles; the cells as many as or twice as many as the styles with imperfect septa; ovules twice as many as the styles, anatropous, pendulous from the inner angles of the cells. *Fruit* a coriaceous or fleshy berry, several- or few-seeded. *Seeds* pendulous, usually oblong, vertically furrowed; testa thin; albumen copious, uniform or ruminant; embryo axial; radicle superior.—DISTRIB. About 320 species, in the tropics generally.

Flowers often 3-merous; ovary 3- or 6-celled ..	..	..	1. MABA.
Flowers mostly 4-5-merous; ovary 4-5 or 8-10-celled ..	..	..	2. DIOSPYROS.

## 1. MABA, Forst.

Trees or shrubs; leaves alternate, entire. *Flowers* diceious (monœcious in *M. Mainingyi*), axillary, shortly pedicellate or in small dense cymes; usually 3-merous, rarely 4- or 5-merous. *Calyx* 3- to 5-fid or partite, rarely sub-truncate, often cup-shaped and accrescent. *Corollatube* usually longer than the calyx; lobes of the limb 3, twisted to the right hand. *Male flowers: stamens* 3 to 21; filaments distinct, in pairs or otherwise united; anthers oblong; ovary rudimentary. *Female flowers: staminodes* 0 to 12; *ovary* 3-celled or perfectly or imperfectly 6-celled, 6-ovulate. *Fruit* ellipsoid or globose, baccate, glabrous or hairy, 1-6-celled and 1-6-seeded, rather dry or fleshy; albumen not ruminant.—DISTRIB. Species about 70; tropical.

Leaves opposite or almost opposite .. ..	1. <i>M. Hierniana</i> .
Leaves alternate :—	
Leaves puberulous on the lower surface, their veins prominent..	2. <i>M. venosa</i> ..
Leaves densely velvety pubescent on the lower surface, their veins obsolete .. ..	3. <i>M. olivacea</i> .
Leaves glabrous or nearly so :—	
Leaves broadly ovate or elliptic, 3 to 5 in. long and 1·65 to 2·65 in. broad; main-nerves 3 to 5 pairs .. ..	4. <i>M. merguensis</i> .
Leaves oblong to oblong-lanceolate 1·5 to 3 in. long and ·65 to 1·35 in. broad :—	
Main-nerves 6 or 7 pairs; fruit globular .. ..	5. <i>M. Clarkeana</i> .
Main-nerves obsolete; fruit obliquely ellipsoid .. ..	6. <i>M. perakensis</i> .
Leaves polymorphous (mostly elliptic obovate or sub-rotund); fruit globular, fusiform .. ..	7. <i>M. burifolia</i> .

1. *MABA HIERNIANA*, King & Gamble, n. sp. A small glabrous shrub; young branches much thinner than a goose-quill, pale, glabrous. *Leaves* opposite, thinly coriaceous; oblong-elliptic, the apex shortly acuminate, the base cuneate, the edges slightly recurved when dry; both surfaces hepatic-brown when dry and shining, the reticulations on the upper distinct; main-nerves 8 to 10 pairs, curved, ascending and forming wide arches near the edge, prominent on the lower surface, faint on the upper; the midrib bold on both; length 6 to 10 in.; breadth 2 to 3·5 in.; petioles ·3 to ·6 in. *Male flowers* unknown. *Female flowers* rotate, ·4 in. across, almost sessile, in axillary or extra-axillary fascicles of 2 or 3. *Calyx* spreading, divided almost to the base into 3 to 5 rotund, minutely crenate, slightly imbricate lobes. *Corolla* nearly twice as long as the calyx, deeply divided into 5 broadly oblong blunt lobes with slightly recurved edges; staminodes 3 or 4, with short thick filaments and broad antherodes. *Ovary* depressed-hemispheric, with short, thick, conical style and small stigma. *Fruit* not seen.

PERAK : *King's Collector* 7920.

2. *MABA VENOSA*, King & Gamble. A tree 15 to 50 feet high; young branches twice as thick as a crow-quill, the bark pale and deciduously cinereous-puberulous. *Leaves* alternate, thinly coriaceous; oblong-elliptic, acute or shortly acuminate, the base slightly cuneate or rounded; both surfaces dark olivaceous when dry; the upper shining, glabrous except the puberulous depressed midrib and main-nerves; the reticulations minute but distinct; lower puberulous everywhere and the midrib prominent; main-nerves 6 to 9 pairs, prominent, curved, spreading, interarching boldly near the edge; length 4·5 to 6·5 in.; breadth 2 to 3 in.; petioles ·35 to ·5 in. *Male and female flowers* alike, in densely crowded extra-axillary cymose fascicles of 5 or 6, not longer than the petioles; flowers mostly sessile, one or

two in each fascicle on a short densely hairy pedicel, rotate, .3 or .4 in. in diam. *Calyx* very coriaceous, divided to the base into 3 spreading broadly ovate lobes with broad blunt apices and concave bases, partly adpressed-pilose and partly glabrescent. *Corolla* smaller and less coriaceous than the calyx, tubular, glabrous, its lobes ovate-elliptic. *Male flowers* with 6 stamens in 2 rows, 3 of them small; anthers cordate, filaments flat; rudimentary ovary ovoid, apiculate, with a dense ring of coarse hair at its base. *Female flowers* with a few flat staminodes; the ovary broadly ovoid apiculate, hirsute in its lower part; styles 3, glabrous, distinct, the stigmas broad. *Fruit* ovoid-globular, glabrous, .75 in. long and .6 in. in diam., blunt at apex and base, the latter subtended by the 3- sometimes 4-lobed, thick, almost woody, accrescent calyx, its lobes spreading, their edges reflexed. *Seeds* elliptic, plano-convex. *Diospyros venosa*, Wall. Cat. 4126.

SINGAPORE: *Ridley* 4961; *King's Collector* 3495, 3862, 7643.

3. MABA OLIVACEA, King & Gamble, n. sp. A tree 50 to 70 feet high; young branches half as thick as a goose-quill, puberulous, pale cinereous when dry. *Leaves* coriaceous, alternate; elliptic, shortly and abruptly apiculate, the base rounded or cuneate, the edges much recurved when dry; upper surface olivaceous, shining, glabrous except the depressed rusty-puberulous midrib; lower surface softly velvety-pubescent, olivaceous, the hair on the bold midrib and 5 to 8 pairs of curved spreading rather prominent main-nerves rusty; length 3 to 5.5 in.; breadth 1.5 to 2.25 in.; petiole .4 in., tomentose. *Male flowers* sessile, .15 in. long, in branched condensed axillary and extra-axillary cymes less than 1 in. long; bracteoles broad, blunt, small. *Calyx* .1 in. long, tubular-campanulate, tomentose outside, glabrous inside, divided nearly to the base into 4 broadly ovate obtuse erect lobes. *Corolla* cylindric-campanulate, glabrous except the hairy edges of the 4 oblong lobes. *Stamens* 8 large and 4 small, lanceolate, on short filaments. *Female flowers* not seen. *Fruit* ellipsoid, blunt at each end, the apex crowned by the short style, glabrous, about .5 in. long, and .4 in. in diam. *Calyx* at the base of the fruit thick, spreading, .6 in. across, with 4 ovate, blunt lobes with reflexed edges.

PERAK: *King's Collector* 7877; *Wray* 1269. LANKAWI: *Curtis* 1661.

4. MABA MERGUENSIS, Hiern in Trans. Camb. Phil. Soc. XII. 134 (1873). A small, nearly glabrous tree; young branches thicker than a crow-quill. *Leaves* alternate, thinly coriaceous, ovate or elliptic, shortly and obtusely acuminate, the base cuneate or rounded; main-nerves 3 to 5 pairs, slightly curved, ascending; length 3 to 5.5 in.; breadth 1.65 to 2.65 in.; petiole about .25 in. long. *Male flowers* in dense minutely



pubescent branching axillary cymes only 1 to 1·5 in. in diam. *Calyx* less than ·25 in. long, with 3 or 4 obtuse triangular lobes. *Corolla* slightly larger than the calyx, shortly 3- or 4-lobed. *Stamens* 14 to 16, glabrous; rudimentary ovary minute. *Female flowers* 3- or 4-merous. *Calyx* lobed half-way down. *Corolla* 3- or 4-merous; *Staminodes* 3 or 4. *Ovary-cells* 6, 1-ovulate. *Styles* 3, distant, glabrous. *Fruit* sub-globular; its calyx ·5 in. in diam. with 3 ovate acute spreading lobes. Kurz in Journ. As. Soc. XLVI., ii. 232, and For. Fl. II. 139; Clarke in Hook. f. Fl. Br. Ind. III. 552.

PENANG: *Helper* (K.D.) 3618; *Curtis* 705, 718.—DISTRIB. Burma.  
Very imperfectly represented in Herbaria.

5. *MABA CLARKEANA*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, puberulous when young, ultimately glabrous, cinereous with small black striæ. *Leaves* alternate, coriaceous; oblong, the apex blunt and sometimes minutely notched, the base cuneate; upper surface olivaceous, glabrous, shining when dry; lower surface dull, paler, sparsely and deciduously adpressed-pubescent and the minute reticulations rather distinct; main-nerves 6 or 7 pairs, spreading, very faint on both surfaces; midrib bold in the lower, depressed on the upper surface; length 1·5 to 3 in., breadth ·65 to 1·25 in.; petioles ·1 in. long. *Male flowers* small (only ·1 to ·15 in. long), crowded in sessile cymes ·25 to ·5 in. long, in the axils of the upper leaves, with a few oblong bracteoles. *Calyx* sessile or subsessile, adpressed-pubescent outside, glabrous inside, divided half-way down into 3 sub-erect broadly ovate acute lobes. *Corolla* smaller than the calyx, densely sericeous outside, glabrous inside, divided to the base into 3 ovate-lanceolate, with an inner row of 3 or 6 similar but narrower, lobes. *Stamens* 6, in pairs, joined by the bases of their broad filaments; anthers lanceolate. *Female flower* unknown. *Fruit* globular, ·35 in. in diam., glabrous. *Calyx* at its base thick, with 3 obtuse angles. *Seeds* 3, 3-sided, ·25 in. long.

PERAK: *King's Collector* 4816.

6. *MABA PERAKENSIS*, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches as thick as a crow-quill, minutely puberulous becoming glabrous, dark-coloured, sub-glaucous. *Leaves* coriaceous, alternate; rather broadly oblong to oblong-lanceolate, the apex acute, the base broad and rounded or slightly cuneate; both surfaces dark olivaceous, the upper shining, the lower dull; main-nerves obsolete; midrib minutely pubescent, prominent on the lower surface, depressed on the upper; length 2·5 to 3 in., breadth ·75 to 1·35 in.; petioles

·15 in. long. *Male flowers* about ·15 in. long, 8 or 10 together in dense sessile axillary clusters not much exceeding the petioles. *Calyx* sessile or nearly so, campanulate, slightly pubescent outside, glabrous inside, deeply divided into 3 broadly ovate acute lobes. *Corolla* tubular; adpressed-sericeous externally, glabrous inside, cut half-way down into 3 ovate acute lobes. *Stamens* 12, 6 of them united by the bases of their filaments; anthers of all lanceolate apiculate, their bases cordate. *Female flower* not known. *Fruit* obliquely ellipsoid, the apex shortly apiculate, glabrous; the calyx at the base sub-ligneous, flat, deeply divided into 3 broad ovate-rotund lobes with reflexed edges and blunt tips. *Seeds* 2, oblong.

PERAK: *Wray* 3130; *King's Collector* 3945, 5519.

7. MABA BUXIFOLIA, Pers. Syn. II. (1807) 606. A bush or small tree; young branches puberulous at first, ultimately glabrous. *Leaves* small, alternate, coriaceous; varying from elliptic to obovate, the apex sub-acute or obtuse, the base always narrowed; upper surface olivaceous, the lower brown; the midrib bold; reticulations rather distinct on the upper surface only; main-nerves 4 to 6 pairs, spreading, slightly prominent on the upper surface, indistinct on the lower; edges slightly recurved; length ·35 to 1 in.; breadth ·3 to ·6 in.; larger in the varieties; petiole less than ·5 in. *Flowers* solitary, or 2 to 3 in short cymes, 3-merous. *Calyx* ·1 in. long, campanulate, with short triangular lobes. *Corolla* campanulate with short triangular lobes. *Male flowers*: *stamens* 6 to 12, glabrous; rudimentary ovary hairy. *Female flower*: *stamens* none; *ovary* 3-celled; style at the apex 3-lobed. *Fruit* globose or ellipsoid, ·35 in. long, 1-seeded. *Calyx* at its base cupular, often very short; albumen equable. *Wight* Ic. t. 763; A. DC. Prod. VIII. 240; Thwaites Enum. Pl. Ceyl. 183; Trimen Fl. Ceyl. III. 89; Hiern in Trans. Camb. Phil. Soc. XII. 116; Kurz For. Fl. II. 139; Clarke in Hook. f. Fl. Br. Ind. III. 551. *M. littorea*, Br. Prod. 527. *M. Cumingiana*, *M. madagascariensis*, *M. guineensis*, *M. Smithiana*, A. DC. l.c. 241. *M. neilgherrensis*, *Wight* Ill. t. 148 bis. E. *M. Ebenus*, *Wight* Ic. tt. 1288-9 (not of Spreng.). *Maba*? Wall. Cat. 7461. *Ferreola buxifolia*, Roxb. Cor. Pl. I. 35, t. 45, and Fl. Ind. III. 790.

MALACCA: *Maingay* (K.D.) 979; *Griffith* (K.D.) 3641. LANGKAWI: *Curtis* 2557. PENANG: *Curtis* 708.—DISTRIB. Malay Archipelago, Br. India, N. Australia, Philippines, tropical Africa.

A variable species, of which two varieties are recognised by Mr. C. B. Clarke in Hooker's "Flora of British India." Both these have leaves longer than as above described, but neither occurs in our region.

## 2. DIOSPYROS, Linn.

Trees, rarely shrubs. *Leaves* alternate or rarely sub-opposite, entire. *Flowers* dioecious, very rarely polygamous, axillary and short-pedicelled, or in small cymes; the ♀ often, and the ♂ sometimes, solitary; usually 4- or 5-merous, rarely 3-merous. *Calyx* usually deeply-lobed, rarely truncate, often in the ♀ larger than in the ♂ and often accrescent and plicate or auriculate in fruit. *Corolla* tubular with short deep lobes, or salver-shaped, or campanulate; the lobes contorted to the right in bud. *Stamens* in the ♂ flowers 4 to 64, often 16; their filaments distinct, paired or polyadelphous; anthers linear, rarely short; *ovary* rudimentary. In the ♀ flowers, *staminodes* 0 to 16; *ovary* 4-5-celled or imperfectly 8-10-celled; the cells usually with 1, rarely with 2 ovules; styles or stigmas 1 to 4. *Fruit* a globose, ellipsoid or ovoid-conic, berry, usually subtended by the enlarged (sometimes woody) calyx; flesh pulpy or viscid. *Seeds* oblong, usually compressed; albumen equable or (rarely) ruminate.—**DISTRIB.** About 220 species, chiefly in the tropics.

Leaves membranous or thinly coriaceous, glabrous or hairy; ♂ flowers in small cymes or fascicles, 4-5-merous; stamens usually 8, 12, or 16; flowers sub-solitary; ♀ calyx longer than that of the ♂, not accrescent or but slightly so, in fruit:—

Leaves under 5 in. long:—

- Fruit globular, glabrous; stamens 16 .. .. 1. *D. Wrayi*.
- Fruit cylindric or oblong-conical, glabrous; stamens about 16; leaves 1 to 1.4 in. long, and under .65 in. broad .. 3. *D. microphylla*.

Fruit ellipsoid:—

Stamens 8:—

Fruit puberulous:—

- Leaves usually under 2.25 in. long, lanceolate or sub-rhomboidal .. .. 2. *D. subrhomboidea*.

- Leaves usually over 2.25 in. long, elliptic-oblong .. 6. *D. Scortechinii*.

- Fruit glabrous; leaves 2.5 to 4.5 in. long .. 5. *D. gracilliflora*.

- Stamens 12; leaves 3.25 to 5 in. long; fruit glabrous .. 7. *D. flavicans*.

- Fruit not known; stamens 12; leaves under 2 in. long .. 4. *D. dumosa*.

- Leaves over 5 in. long; fruit ovoid-conic, rusty-setose; stamens 6 to 12 .. .. 8. *D. apiculata*.

Leaves coriaceous, upper surface glabrous and shining; flowers mostly 4-merous, a few 5-merous; ♂ flowers in small cymes or clusters; calyx deeply lobed, often larger in the ♀ and differing in shape from that of the ♂:—

Calyx 4-lobed:—

Leaves under 5 in. long:—

Leaves under 1.5 in. broad:—

- Calyx of ♀ flower densely sericeous-pubescent, lobes reniform; fruit ovoid or sub-globose, rusty villous, its calyx 1 in. in diam. .. .. 9. *D. lanceæfolia*.

- Calyx-margins of ♀ flower tomentose, lobes broadly ovate; fruit globose, ultimately glabrous, .75 in. long 14. *D. lucida*.  
 Leaves 1.5 to 2.5 in. broad :—  
 Stamens about 12; main-nerves of leaves 8 to 9 pairs 10. *D. pachyphylla*.  
 Stamens about 16; main-nerves of leaves 6 to 7 pairs 11. *D. clavigera*.  
 Stamens 16, in pairs; main-nerves of leaves 5 pairs 13. *D. styraciformis*.  
 Leaves usually more than 5 and less than 7.5 in. long :—  
 Leaves under 6.5 in. long, over 2.5 in. broad; fruit olive-shaped, nearly 2 in. long and 1.25 in. in diam. .. 12. *D. bilocularis*.  
 Leaves under 2.5 in. broad :—  
 Leaves under 6.5 in. long; main-nerves of leaves not visible, probably many pairs; fruit depressed-globose, 1.35 in. in diam.; persistent calyx thick, woody .. 25. *D. oleifolia*.  
 Leaves under 7.5 in. long; main-nerves 5 to 8 pairs; fruit ellipsoid, 1 in. in diam.; persistent calyx with large membranous lobes .. .. 27. *D. paniculata*.  
 Leaves usually more than 6 and less than 12 in. long :—  
 Leaves beneath covered with appressed sericeous hair; stamens 20 to 24; main-nerves of leaves not visible .. 21. *D. argentea*.  
 Leaves beneath glabrous except the midrib, which is covered with dark hair; main-nerves of leaves 7 to 8 pairs; fruit glabrous .. .. 17. *D. tristis*.  
 Leaves beneath glabrous or only minutely puberulous :—  
 Leaves usually 3 to 3.5 in. broad :—  
 Main-nerves of leaves 8 to 10 pairs; apex caudate-acuminate, base cuneate .. .. 18. *D. pauciflora*.  
 Main-nerves of leaves 10 to 12 pairs; apex acute, base rounded .. .. 19. *D. ellipsoidea*.  
 Leaves reaching 4 in. broad; fruit glabrescent :—  
 Main-nerves of leaves 8 to 14 pairs; apex sub-acute 23. *D. Horsfieldii*.  
 Main-nerves of leaves 16 to 20 pairs; apex shortly acuminate .. .. 24. *D. toposioides*.  
 Leaves 3.5 to 4.5 in. broad; main-nerves of leaves 8 to 12 pairs; apex acute; fruit densely rusty-tomentose, ridged .. .. 28. *D. Kunstleri*.  
 Leaves 8 to 14 in. long, 2.5 to 5 in. broad; main-nerves 14 to 18 pairs; fruit sub-globose, 1 in. in diam., immersed in the thickened calyx .. .. 20. *D. Wallichii*.  
 Leaves 10 to 18 in. long, 2 to 4 in. broad; main-nerves 14 to 20 pairs; fruit depressed-globose, 2 in. in diam., seated on a cupular calyx .. .. 22. *D. rigida*.  
 Calyx 5-lobed :—  
 Leaves glabrous beneath, 7 to 9 in. long, 3 to 3.75 in. broad; main-nerves 16 to 18 pairs .. .. 15. *D. oblonga*.  
 Leaves puberulous on the midrib and main-nerves beneath, 5.5 to 7.5 in. long, 2.5 to 3.25 in. broad; main-nerves 10 to 12 pairs .. .. 16. *D. Helferii*.  
 Leaves glabrous beneath, 5.5 to 9 in. long, 1.5 to 2.5 in. broad; main-nerves 10 to 12 pairs .. .. 26. *D. brachiata*.  
 Leaves thinly coriaceous, glabrous above, puberulous beneath; both ♂ and ♀ flowers in few-flowered cymes, on long, slender, extra-axillary peduncles, pendulous; calyx 5-lobed, not accrescent in fruit .. .. 29. *D. nutans*.



SPECIES IMPERFECTLY KNOWN.

Calyx of fruit long, woody, its lobes pointed and much reflexed, leaves glabrous .. .. .	30. <i>D. reflexa</i> .
Leaves oblong, hairy beneath, cordate at the base. Calyx in fruit small. Fruit globular, rusty-pubescent .. .. .	31. <i>D. penangiana</i> .
Leaves quite glabrous, elliptic, narrowed at each end, not cordate. Fruit globular with small calyx .. .. .	32. <i>D. rufa</i> .
Leaves coriaceous, quite glabrous, oblong, areolar-reticulate. Male flowers in terminal tomentose cymes .. .. .	33. <i>D. areolata</i> .
Leaves membranous, oblong or oblong-elliptic, glabrous. Female flowers in fascicles of about 3. Calyx with reniform lobes; pedicels bi-bracteolate. Corolla salver-shaped .. .. .	34. <i>D. Curtisii</i> .
Leaves membranous, puberulous beneath. Male flowers in dense short hairy glomeruli. Stamens 8 .. .. .	35. <i>D. glomerulata</i> .
Leaves puberulous beneath. Calyx-lobes 4; stamens 16 .. .. .	36. <i>D. caliginosa</i> .

1. *DIOSPYROS WRAYI*, King & Gamble, n. sp. A shrub 4 to 12 feet high; young branches as thick as a crow-quill, cinereous- or rusty-puberulous. *Leaves* small, alternate, membranous; ovate-lanceolate to narrowly elliptic, shortly acuminate, the base cuneate; both surfaces dark olivaceous; the upper very shining and minutely reticulate, glabrous except the puberulous depressed midrib; the lower more brown and dull, the midrib pubescent and prominent, the reticulations less distinct; length 2 to 4 in., breadth .75 to 1.5 in.; petioles .05 to .1 in. *Male flowers* .25 in. long, 2 to 4 together in small axillary cymes, black when dry, puberulous, pedicels very short. *Calyx* less than .1 in. long, narrowly campanulate with 4 deep ovate lobes. *Corolla* three times as long as the calyx, salver-shaped, sub-glabrous; limb with 4 oblong lobes. *Stamens* 16, united in pairs by the bases of the unequal filaments, broadly lanceolate, inserted near the base of the tube. *Female flowers* like the ♂ but longer—especially the calyx. *Staminodes* about 8, lanceolate. *Ovary* glabrescent, ovoid-conic, tapering into a rather long style; stigmas 4, fleshy, short. *Fruit* globular, crowned by the short style, glabrous, shining, black when ripe (when dry); calyx at its base .75 in. across, coriaceous, deeply divided into 4 oblong blunt or sub-acute reflexed lobes.

PERAK: *Scortechini*; Wray 2764, 3272, 3955; King's Collector 2076, 2993.

2. *DIOSPYROS SUB-RHOMBOIDEA*, King & Gamble, n. sp. A shrub 4 to 6 feet high; young branches thinner than a crow-quill, softly tawny-pubescent, pale brown when dry. *Leaves* small, alternate; lanceolate or ovate-lanceolate or sub-rhomboidal, bluntly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper dark, glabrous except the puberulous midrib, the lower sparsely adpressed pubescent especially on the bold midrib; main-

nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.5 to 2.25 in., breadth .6 to .8 in.; petiole about .1 in. *Male flower* .6 in. long, solitary, axillary on a short tomentose pedicel with 2 broad bracteoles. *Calyx* less than .1 in. long, pubescent outside, glabrous inside, deeply divided into 4 broad obtuse almost quadrate imbricate lobes. *Corolla* salver-shaped; the tube cylindric, tapering to the apex, tomentose outside; limb as long as the tube but less hairy outside, glabrous inside like the tube, deeply divided into 4 oblong sub-acute lobes with inflexed edges, twisted to the right in bud. *Stamens* 8, attached near the bottom of the tube, 4 shorter than the others; anthers all lanceolate, and on short filaments. *Female flower* not known. *Fruit* ellipsoid, sparsely adpressed-puberulous, crowned by the conic style, .8 or .9 in. long and .4 in. in diam. *Calyx* at its base .25 in. across, flat, with 4 spreading, broad, blunt lobes.

PERAK: Wray 4055; King's Collector 7302.—DISTRIB. Sumatra, Forbes 2004.

3. DIOSPYROS MICROPHYLLA, Bedd. Ic. Pl. Ind. Or. 27, t. cxxxiii. (1874), and Fl. Sylv. Madr. cxlv. A tree 20 to 30 feet high; young branches as thick as a crow-quill or thinner, densely pubescent. *Leaves* thinly coriaceous, alternate, distichous; ovate-lanceolate, sub-rhomboid, the apex sub-acute, the base cuneate; upper surface dark olivaceous-brown, glabrous except the pubescent depressed midrib; the lower dark brown, puberulous, the midrib pubescent; main-nerves obsolete on both surfaces; length 1 to 1.4 in., breadth .45 to .65 in.; petiole .05; the largest leaves towards the ends of the branches. *Male flowers* solitary or 3 together in a minute cyme. *Calyx* .05 long, deeply 4-lobed, tube glabrate. *Corolla* slightly longer than the calyx with 4 rounded lobes. *Stamens* about 16. *Female flowers* .2 in. long, axillary, solitary, pedicellate or in a pair on a short peduncle. *Calyx* campanulate, deeply divided into 4 sub-rotund imbricate very obtuse lobes, sericeous on the middle outside and on the edges, otherwise glabrous. *Corolla* salver-shaped, somewhat longer than the calyx, deeply cut into 4 unequal rotund lobes, adpressed-puberulous on the back of the lobes, otherwise glabrous. *Ovary* ovoid, sericeous near the apex and base; style thick, 2-fid; stigmas 4. *Ovary* 4-celled, ellipsoid, conic, 4-celled, cells 1-ovuled. *Fruit* cylindric or oblong-conical, dry, glabrous, 1-celled, 1- rarely 2-seeded, .75 to 1 in. long. Clarke in Hook. fil. Fl. Br. Ind. III. 559. *D. buxifolia*, Hiern in Trans. Camb. Phil. Soc. XII. 218. *D. vaccinioides*, Wall. Cat. 4130 (in part). *Leucorylum buxifolium*, Blume Bijdr. 1169; Miq. Fl. Ind. Bat. II. 1050; Choisy Mem. Ternstr. 43 t. 2.

MALACCA: Griffith (K.D.) 3643; Walker 170; Maingay (K.D.) 966. SINGAPORE: Ridley 6045. PENANG: Curtis 1513, 7175. PERAK:

*Scortechini* 2052.—DISTRIB. Andaman Islands, South India, Malay Archipelago.

4. *DIOSPYROS DUMOSA*, King & Gamble, n. sp. A small tree; young branches as thick as a crow-quill, glabrous, dark-coloured when dry. *Leaves* small, alternate, membranous; lanceolate, shortly acuminate, the base cuneate; upper surface dark olivaceous when dry, glabrous; lower yellowish, slightly puberulous on the slightly prominent midrib and 4 or 5 pairs of curved ascending nerves; length 1·5 to 2 in.; breadth ·5 to ·75 in.; petiole ·05 in. *Male flowers* ·5 in. long, in small axillary sessile fascicles of 3 or 4. *Calyx* ·25 in. long, deeply divided into 3 or 4 ovate-lanceolate acuminate lobes, concave along the midrib, and with undulate edges, pubescent. *Corolla* twice as long as the calyx, narrowly tubular, deeply divided into 4 narrow oblong glabrous lobes, the tube pubescent inside and outside. *Stamens* 12, inserted at its base on unequal slender filaments; anthers broadly lanceolate, much apiculate. *Female flowers* solitary, axillary, shortly pedicellate, ·4 in. long. *Calyx* cleft to the base into 4 large broadly ovate reniform bluntly acuminate undulate lobes, sparsely adpressed-pubescent on both surfaces, ·25 in. long and as much across. *Corolla* a little longer but less hairy than the calyx, fleshy, tubular, tetragonous, divided for half its length into 4 narrow oblong lobes. *Staminodes* 8, linear-lanceolate, apiculate, on slender filaments. *Ovary* narrowly ellipsoid, tapering to the rather long style, glabrous. *Fruit* unknown.

PERAK: *Wray* 3508. JUNKSEYLON (Tongka): *Curtis* 2907.

5. *DIOSPYROS GRACILIFLORA*, Hiern in Trans. Camb. Phil. Soc. XII. 191 (1873). A glabrous tree 40 to 50 feet high; young branches less than half as thick as a goose-quill, deciduously puberulous, dark-coloured and striate when dry. *Leaves* thickly membranous, alternate; rather narrowly elliptic, shortly and bluntly apiculate to caudate-acuminate, the base much narrowed and often slightly oblique; both surfaces dull dark olivaceous-brown when dry, glabrous except for some minute hairs on the nerves beneath; main-nerves about 5 pairs, curved, ascending, depressed or obscure on the upper surface, pale and slightly prominent on the lower like the midrib; length 2·5 to 4·5 in., breadth ·75 to 1·35; petioles ·1 to ·2 in. *Male flowers* ·5 in. long, few together, in small axillary cymes about as long as the petioles, sessile, puberulous. *Calyx* large, two-thirds to one-half the length of the corolla, but much wider, deeply divided into 4 large ovate-rotund undulate semi-erect lobes. *Corolla* narrowly tubular, one-third to one-half longer than the calyx; the tube externally with 4 lines of pubescence, otherwise glabrescent; limb with 4 deeply oblong broad blunt glabrous spreading sub-undulate lobes. *Stamens* 8, in two rows,

4 of them smaller than the other 4; anthers linear-lanceolate, apiculate, the filaments flat, very short; rudimentary ovary small, narrowly ovate, glabrous. *Female flowers* like the ♂ and often mixed with them, but sometimes solitary. *Ovary* broadly ovoid, with short style, glabrous. *Fruit* ellipsoid, 1 in. long and .75 in. in diam., glabrous, crowned by the short remains of the style, and subtended by the calyx with 4 spreading, undulate, sub-glabrous lobes. *D. flavicans*, Hiern in Trans. Camb. Phil. Soc. XII. 205 (as to female plant partly). *D. decipiens*, Clarke in Hook. fil. Fl. Br. Ind. III. 563.

MALACCA: *Maingay* (K.D.) 972 (♀ only). PERAK: *Scortechini* 181, 198; *Wray* 1298, 2843, 3214, 4227; *King's Collector* 884, 3298, 3354, 3366, 3588, 3394, 5173, 6742, 7990, 10463. PENANG: *Curtis* 3041.—DISTRIB. Java, *Beccari* 1560.

6. *DIOSPYROS SCORTECHINII*, King & Gamble, n. sp. A tree 15 to 30 or even 50 feet high; young branches as thick as a crow-quill, tawny-puberulous, angled, pale when dry. *Leaves* alternate, small, membranous; narrowly elliptic-oblong, acuminate, much narrowed at the base to the short petiole; both surfaces olivaceous-brown when dry, the upper glabrous, the lower often puberulous, especially on the midrib; main-nerves 8 to 12 pairs, spreading, curved, ascending, somewhat distinct on the lower surface, faint on the upper as are the transverse reticulations; length 2 to 4 in., breadth .6 to 1.25 in.; petiole .1 to .15 in. *Male flowers* .5 in. long, in shortly pedunculate axillary fascicles of 2 or 3, or solitary and pedicellate. *Calyx* .1 in. long, tomentose outside, glabrous inside, .1 in. long, campanulate, deeply divided into 4 broad almost truncate lobes. *Corolla* coriaceous, .3 in. long, glabrous; tube tapering a little to the apex; lobes 4, oblong, sub-acute, spreading. *Stamens* 8; anthers shortly lanceolate, as long as the filaments. *Female flowers* longer than the ♂, solitary, the pedicel as long as the calyx, tomentose. *Ovary* ellipsoid, densely pilose; style short, conic; stigmas small, glabrous. *Fruit* ellipsoid, crowned by the very short style, puberulous. *Calyx* at its base cupular, .2 in. across, tomentose outside, .75 in. long and .4 in. in diam.

PERAK: *Curtis* 2092; *King's Collector* 2407, 4126, 5002, 5296, 6356; *Scortechini* 377; *Wray* 638.

7. *DIOSPYROS FLAVICANS*, Hiern in Trans. Camb. Phil. Soc. XII. 205 (1873). A tree 40 to 70 feet high; young branches rather thicker than a crow-quill, cinereous-puberulous becoming glabrous. *Leaves* alternate, thinly coriaceous; elliptic to oblong-elliptic, apex shortly acuminate, the base cuneate; upper surface when dry olivaceous, glabrous, the lower pale brown, densely puberulous on the stout midrib; main-nerves 5 to



7 pairs, curved, ascending; length 3·25 to 5 in., breadth 1·35 to 2·5 in.; petioles ·1 to ·15 in. *Male flowers* ·45 in. long, 2 to 6 together, in axillary or extra-axillary bracteate sessile tomentose fascicles. *Calyx* sub-sessile, campanulate, pubescent outside, glabrous inside; the limb deeply divided into 5 broadly ovate, bluntly acuminate spreading lobes. *Corolla* salver-shaped; tube slightly inflated and glabrous in the lower half outside, cylindric and pubescent in the upper half, inside glabrous; limb with 4 broadly oblong obtuse glabrescent spreading lobes. *Stamens* 12, of different lengths, attached in 3 rows in the tube; anthers lanceolate-cordate, apiculate; filaments slender and of varying length; rudimentary ovary none. *Female flowers* conspicuously bi-bracteate, in cymes like the ♂ but shortly pedunculate. *Calyx* as in the ♂ but less deeply lobed. *Fruit* ellipsoid, not much narrowed at the ends, slightly tetragonous, glabrous, ·75 in. long and about ·35 in. in diam., crowned by the short remains of the style; the calyx clasping its base, about half as long, with 4 deep triangular lobes. *Seeds* 4, ridged. Clarke in Hook. fil. Fl. Br. Ind. III. 562; Kurz in Journ. As. Soc. Beng. XLVI., ii. 236, For. Fl. II. 135. *Guatteria?* *flavicans*, Wall. Cat. 7295. *Ebenacea*, sp. 2, Griff. Notul. IV. 291.

MALACCA: *Griffith* (K.D.) 454, 3623; *Maingay* (K.D.) 972 (as to male plant only); *Helper* (K.D.) 3639? PENANG: *Curtis* 1602. SELANGOR: *Ridley* 10556. PERAK: 2058; *King's Collector* 2480, 3354, 3380, 3774, 6149, 6633, 10007.

8. *DIOSPYROS APICULATA*, Hiern in Trans. Camb. Philos. Soc. XII. 186 (1873). A shrub or small tree; young branches half as thick as a goose-quill, fulvous-hirsute. *Leaves* alternate, membranous; oblong or elliptic-oblong, sometimes rather oblanceolate, finely caudate-acuminate, slightly narrowed to the rounded or somewhat cuneate base; both surfaces dark olivaceous-brown when dry, transversely reticulate; upper surface sparsely adpressed-pubescent, the midrib and main-nerves pubescent and slightly depressed; lower surface darker, and with many long rather coarse hairs, especially on the prominent midrib and 8 to 10 pairs of slightly curved ascending main-nerves; length 5·5 to 7 in., breadth 1·5 to 2·5 in.; petiole ·1 in., tomentose. *Male flowers* about 3 together, axillary, sub-sessile, ·35 in. long. *Calyx* 4- to 5-partite, about ·25 in. long, pubescent, lobes narrowly lanceolate. *Corolla* tubular, 4-lobed, ·4 in. long, the lobes spreading, oval, obtuse. *Stamens* 6 to 12, unequal, glabrous; anthers linear-oblong, acuminate; filaments often geniculate, dilated and somewhat united at the base, rudimentary ovary small, hairy. *Female flowers* 1 to 3 together on short axillary, minutely hispid cymes.

*Fruit* sub-sessile, solitary, ovoid-conic, finely rusty-setose, especially in the upper half, about 1 in. long and .5 to .75 in. across, apiculate. *Seeds* about 4, albumen not ruminant. Clarke in Hook. fil. Fl. Br. Ind. III. 553.

MALACCA: *Maingay* (K.D.) 1514. PERAK: *King's Collector* 5127, 6770. PENANG: *Curtis* 1584.

9. *DIOSPYROS LANCEEFOLIA*, Roxb. Hort. Beng. 93 (1814). A tree; young branches twice as thick as a crow-quill, adpressed-puberulous, dark brown when dry. *Leaves* alternate, coriaceous; oblong, lanceolate or oblong-lanceolate, acute or acuminate, the base rounded or cuneate, the edges recurved; both surfaces olivaceous-brown when dry, the upper darker and shining, the lower paler and dull; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; midrib bold on the lower surface, depressed on the upper; length 2 to 3 in.; breadth .65 to 1 in.; petiole .15 to .2 in. *Male flowers* sessile in clusters. *Calyx* .15 in. long with 4 ovate tawny-sericeous lobes. *Corolla* .35 to .5 in. long, narrowed upwards, the lobes .15 in. long. *Stamens* about 16; anthers linear, glabrous or slightly pilose at the base; filaments minutely pilose. *Female flowers* solitary or in pairs on the branches below the leaves, .5 in. long. *Calyx* .3 in. long, very coriaceous, densely sericeous-pubescent on both surfaces, deeply divided into 4 erect, broadly reniform, acute lobes. *Corolla* a little longer than the calyx, densely sericeous-tomentose outside, the tube glabrous inside; lobes of limb 4, oblong, very thick. *Staminodes* 8, linear compressed. *Ovary* broadly ovate, acuminate, densely silky; stigmas 4, glabrous. *Fruit* ovoid or sub-globose, rusty-villous; its calyx 1 in. in diam. with thickened tube and spreading lobes. Roxb. Fl. Ind. II. 537; A. DC. Prod. VIII. 232; Hiern in Trans. Camb. Phil. Soc. XII. 213; Kurz in Journ. As. Soc. XLVI., ii. 236, and For. Fl. II. 136; Clarke in Hook. fil. Fl. Br. Ind. III. 562. *D. multiflora*, Wall. Cat. 4144; A. DC. l.c. 231. *D. amena*, Wall. Cat. 4139; A. DC. l.c. 231.

SINGAPORE: *Ridley* 4964. PAHANG: *Ridley* 1601.—DISTRIB. Assam range of hills, Burma, Sumatra.

The chief characters separating this from *D. lucida*, Wall., are the longer lobes of the calyx of the female flower and the somewhat larger and more hairy fruit. This species is not common within our area, whereas *D. lucida* is a common tree.

10. *DIOSPYROS PACHYPHYLLA*, Clarke in Hook. fil. Fl. Br. Ind. III. 568 (1882). A tree; young branches rather thinner than a goose-quill, deciduously puberulous, soon glabrous. *Leaves* coriaceous, alternate; elliptic or oblong, sub-acute, the base rounded; both surfaces when

dry rather pale olivaceous-brown, glabrous; the upper shining, the lower glaucous, dull; main-nerves 8 or 9 pairs, curving upwards, faint on both surfaces midrib bold on the lower surface, depressed on the upper; length 3 to 5 in., breadth 1.5 to 2.5 in.; petiole .25 to .4 in. *Male flowers* in short rusty-pubescent axillary and extra-axillary cymes from .5 to .75 in. long, bracts ovate, .1 in. long. *Calyx* .15 in. long, campanulate, adpressed rusty-tomentose on both surfaces, cut half-way into 4 broad triangular erect lobes. *Corolla* tomentose externally (*vide* C. B. Clarke) nearly .5 in. long, its lobes about .1 in. *Stamens* about 12; anthers linear, with villous connective and glabrous filaments. *Female flowers* unknown. *Fruit* globular, the apex concave and bearing the short remains of the style, .65 in. in diam., minutely rusty adpressed-pubescent, becoming glabrous; the *calyx* at its base woody, cupular, with 4 broad lobes with reflexed apices.

MALACCA: *Maingay* (K.D.) 974. SINGAPORE: *Ridley* 5644.

This does not agree with *D. undulata*, Wall., of which Hiern, in Trans. Camb. Phil. Soc. XII, 215, makes it a variety. It comes much nearer to, but is smaller in all its parts than, the plant named by us *D. Wallichii*, which was originally issued as *D. macrophylla*, Wall. Cat. 4141.

11. *DIOSPYROS CLAVIGERA*, Clarke in Hook. fl. Fl. Br. Ind. III. 558 (1882). A tree; all parts glabrous except the minutely pilose-ciliate margin of the calyx. *Leaves* alternate, coriaceous, elliptic, tapering slightly to each end (sub-rhomboidal); both surfaces warm brown when dry, the upper glabrous, shining, the lower dull; main-nerves 6 or 7 pairs, little curved, ascending, slightly prominent on the lower surface, faint on the upper; length 3.25 to 4.5, breadth 1.5 to 2.15 in.; petioles .15 to .2 in. *Male flowers* 3 to 16 together in small sub-sessile axillary and extra-axillary cymes. *Calyx* .15 in. long, deeply divided into 4 obtuse lobes. *Corolla* (in bud) .35 in. long, clavate, glabrous outside, the upper part very thick, 4-lobed. *Stamens* about 16, glabrous; anthers oblong, shortly apiculate. *Female flower* and fruit unknown. *D. Ebenum*, Hiern (*not of Koenig*) in Trans. Camb. Phil. Soc. XII. 208 (*in part*).

MALACCA: *Maingay* (K.D.) 971; *Griffith* (K.D.) 3635. LANGKAWI: *Curtis* 3418. SINGAPORE: *Maingay* 5066.

12. *DIOSPYROS BILOCULARIS*, Oliver in Hook. Ic. Pl. t. 2336 (1894). A glabrous tree 60 to 80 feet high; young branches about the thickness of a goose-quill, dark purplish when dry and shining, slightly striate. *Leaves* thickly coriaceous; elliptic, sub-acute, the base slightly cuneate, the edges (when dry) recurved; both surfaces olivaceous when dry, the upper shining, the lower paler and dull; midrib inconspicuous and

slightly channelled on the upper surface, bold on the lower; main-nerves 10 to 12 pairs, slightly curved, spreading, interarching far from the edge, faint on both surfaces; length 5 to 6.5 in., breadth 2.5 to 3.25 in. *Male flowers* .65 in. long (in bud) on rusty-pubescent pedicels .3 to .4 in. long, in axillary and extra-axillary fascicles of 2 to 4, with a few tomentose bracteoles at their bases. *Calyx* very coriaceous, .25 in. long and nearly as much in width at the mouth; limb 4-lobed, the lobes very short and broad. *Corolla* narrowly tubular, .4 in. long, very thick; lobes of limb long, narrowly oblong. *Stamens* 16; sub-sessile, linear, sub-equal, apiculate; rudimentary ovary none. *Female flower*; calyx and corolla as in the ♂, staminodes none; *ovary* oblong or oval-ovoid, narrowed at the apex, longer than the calyx, 2-celled; ovules 2 in each cell and pendulous. *Fruit* olive-shaped, shortly apiculate, 1.5 to 2 in. long and 1 to 1.25 in. in diam. at the middle, yellow when ripe; its pedicel obconic, stout, woody, .4 in. long; calyx in ripe fruit flat, with 4 broad blunt lobes. *Seed* solitary; pericarp thin, only .3 in. across, albumen large stellately ruminant. *Maba Maingayi*, Hiern in Trans. Camb. Phil. Soc. XII. 107; Clarke in Hook. fil. Fl. Br. Ind. III. 552.

MALACCA: *Maingayi* (K.D.) 976; Derry 1092. SINGAPORE: *Ridley* 27, 2755, 4920. PERAK: at elevations of 1,500 to 2,000 feet, *King's Collector* 7383.

13. *DIOSPYROS STYRACIFORMIS*, King & Gamble, n. sp. A tree(?); young branches rusty-pubescent, slightly thicker than a crow-quill. *Leaves* thinly coriaceous; elliptic to elliptic-lanceolate, the apex subacute or acute, the base cuneate; upper surface dark olivaceous, shining, glabrous except the depressed midrib; the lower surface dull, paler, with deciduous rufous pubescence, especially on the prominent midrib; main-nerves about 5 pairs, ascending, little curved, slightly prominent on the lower surface only; length 2.5 to 4 in., breadth 1 to 2 in.; petiole .2 to .35 in. *Male flowers* a few together in short cymes grouped in small axillary clusters. *Calyx* .2 in. long, narrowly campanulate, densely rusty-tomentose externally like the corolla, the mouth with deep narrowly-triangular teeth. *Corolla* .5 in. long, narrowly tubular, cut half-way down into 4 oblong blunt lobes. *Stamens* 16, in pairs, unequal, linear, apiculate; filaments unequal in length; rudimentary ovary none. *Female flowers* solitary, calyx much longer than in the ♂; its 4 lobes thick, broad, reniform, rusty-pubescent. *Corolla* not known; *ovary* hairy. *Fruit* globose with the apex truncate and depressed in the middle, densely but minutely pale rusty-tomentose, .5 in. long and about .65 in. in diam. *Calyx* at its base deeply cupular with 4 spreading triangular teeth. *D. nov. spec.*, C. B. Clarke in Herb.



Kew. *D. hirsuta*, Linn. fil., ? var., Hiern in Trans. Camb. Phil. Soc. XII. 165.

MALACCA : *Maingay* (K.D.) 969. SINGAPORE : *Ridley* 3787.

Ridley's No. 1084, from Bukit Timah, in Singapore, seems to belong to this. The only specimen I have seen is imperfect.

14. *DIOSPYROS LUCIDA*, Wall. Cat. 4127 (1829). A tree 40 to 50 feet high; young branches from half as thick to as thick as a crow-quill, minutely puberulous, becoming glabrescent, dark-coloured. *Leaves* alternate, coriaceous; oblong or elliptic-oblong, sub-acute or obtuse, the base rounded or cuneate, sometimes a little oblique; both surfaces when dry pale olivaceous-brown, glabrous; main-nerves 5 to 9 pairs, spreading, curved, faint on the lower surface, slightly depressed on the upper; midrib bold on the lower surface, somewhat depressed on the upper; length 1.25 to 4.5 in., breadth .5 to 1.5 in.; petioles .2 to .4 in. *Male flowers* sessile, in small fascicles. *Calyx* nearly .15 in. long, campanulate, with 4 erect broadly triangular lobes, tomentose on both surfaces. *Corolla* narrowly tubular, more than twice as long as the calyx, tetragonous in bud, sericeous-tomentose outside, the tube glabrous inside; limb deeply divided into 4 narrowly oblong thick lobes. *Stamens* 12 to 16, in pairs united by their short filaments and face to face; anthers linear, glabrous, minutely apiculate, and on short sericeous filaments; rudimentary ovary linear. *Female flowers* 1 or 2 together, axillary or extra-axillary, sub-sessile. *Calyx* longer than in the ♂, lobed nearly to the base; lobes broadly ovate, their recurved margins minutely tomentose. *Fruit* globose, .75 in. or more in diam., sub-truncate and slightly umbonate at the apex, adpressed rusty-pubescent at first, ultimately glabrous, 4-6-seeded; the accrescent *calyx* at its base woody, cupular, .6 in. across with 4 short broad reflexed lobes; albumen of seed not ruminant. A. DC. Prod. VIII. 233; Clarke in Hook. fil. Fl. Br. Ind. III. 568. *D. hirsuta*, var. *lucida* Hiern in Trans. Camb. Phil. Soc. XII. 163(not of Linn. fil.)

MALACCA : *Griffith* (K.D.) 3637; *Maingay* (K.D.) 970, 973, 977, 3,500; *Derry* 1439. PERAK : *Scortechini*; *Wray* 3018, 3056. PENANG : *Curtis* 250, 1602; *King's Collector* 1050, 1760. SINGAPORE : *Ridley* 2119, 2749, 3580, 4962, 4963, 6129, 8115, 9212, 9517.

This is probably only a southern form of the Indian species *D. lanceæfolia*, Roxb.

15. *DIOSPYROS OBLONGA*, Wall. Cat. 4124 (1829). A tree; young branches thinner than a goose-quill, purplish-brown when dry, glabrous. *Leaves* alternate, coriaceous, glabrous; oblong-elliptic, shortly and abruptly apiculate, the base rounded or slightly cuneate; both surfaces

faintly reticulate, quite glabrous, shining; main-nerves 16 to 18 pairs, spreading, little curved, interarching boldly at a little distance from the edges, prominent on the lower surface, depressed on the upper; midrib very bold on the lower surface, depressed on the upper; length 7 to 9 in., breadth 3 to 3.75 in.; petiole .4 in., very stout. *Male flowers* about .5 in. long, salver-shaped, in short axillary cymes, coriaceous, subsessile, .5 in. long. *Calyx* and *corolla* everywhere adpressed-tomentose. *Calyx* shorter than the corolla, campanulate, cleft to near the base into 5 oblong, blunt, sub-erect lobes. *Corolla-tube* narrow, not constricted at the throat; limb with 5 large broad rotund lobes with recurved edges. *Stamens* 10, united in pairs by the bases of their filaments, the inner ones smaller, all inserted on the base of the calyx-tube. *Female flowers* 1 to 5 together, .25 to .3 in. long, with 5 deep ovate-oblong auriculate sub-plicate lobes. *Corolla* .35 in. long, densely hairy outside, deeply lobed; staminodes 5; *ovary* 10-celled, rusty-hairy. *Fruit* sub-globose, sub-truncate at base and apex, glabrous when ripe; the hispid accrescent *calyx* .75 in. across, its lobes auriculate; albumen of seed not ruminant. A. DC. Prod. VIII. 243; Hiern in Trans. Camb. Phil. Soc. XII. 243; Clarke in Hook. fil. Fl. Br. Ind. III. 569; Miq. Fl. Ind. Bat. II. 1045.

MALACCA: *Maingay* (K.D.) 967. PENANG: *Curtis* 1564, 2487. 3658. SINGAPORE: *Ridley* 2747, 3031, 6311. PERAK: *King's Collector* 3794, 4924, 7237, 8278.

16. DIOSPYROS HELFERI, Clarke in Hook. fil. Fl. Br. Ind. III. 569 (1882). A tree 20 to 30 feet high; young branches half as thick as a goose-quill, pale puberulous, the bark dark. *Leaves* alternate, coriaceous; elliptic or elliptic-oblong, sub-acute or obtuse, the base broad or sub-acute; the upper surface dark olivaceous-brown when dry, glabrous except the depressed puberulous midrib, the reticulations minute but distinct; lower brown, glabrescent but puberulous on the rather stout midrib and nerves; main-nerves 10 to 12 pairs, rather faint, spreading, horizontal, interarching boldly about .25 in. from the edge; length 5.5 to 7.5 in., breadth 2.5 to 3.25 in.; petiole .4 to .5 in., stout, pubescent. *Male flowers* unknown. *Female flowers* .5 in. long, axillary, solitary or 2 together, sessile. *Calyx* coriaceous, densely pubescent inside and out, deeply divided into 5 broadly oblong, sub-acute lobes, accrescent, and becoming concave along the midribs of the lobes. *Corolla* somewhat longer than the calyx, sericeous externally; the tube short, the limb-lobes deep, broadly oblong, blunt; staminodes few, flat. *Ovary* broadly ovoid, densely sericeous-tomentose. *Fruit* ovoid-ellipsoid, nearly 1 in. long, and slightly less in diam., glabrous; the accrescent *calyx* embracing its base deeply 5-lobed, plicate.

MALACCA: *Griffith* (K.D.) 3632. KEDAH: *Curtis* 2596, 8327?; *Ridley* 327.

17. *DIOSPYROS TRISTIS*, King & Gamble, n. sp. A tree 40 to 50 feet high; young branches half as thick as a goose-quill, covered with deciduous almost black tomentum. *Leaves* alternate, coriaceous; oblong-elliptic, shortly acuminate, the base rounded or cuneate; both surfaces dingy olivaceous-brown when dry, minutely reticulate; upper surface glabrous, shining, the lower dull, the prominent midrib densely clothed with dark hairs; the 7 or 8 pairs of prominent ascending main-nerves and the intermediate spaces with a few similar hairs with bulbous bases; length 6 to 9 in., breadth 2 to 2.75 in.; petioles .4 to .5 in. *Male flowers* .3 in. long, in short axillary cymes .75 in. long, the branches and pedicels densely dark rusty-tomentose outside. *Calyx* glabrous inside; the mouth with 5 broad short obtuse teeth. *Corolla* fleshy, glabrous, like the calyx in shape and of about the same length. *Stamens* 24; anthers lanceolate, shortly appendiculate at the apex, sessile. *Female flowers* unknown. *Fruit* depressed-globose, glabrous, shining, nearly 2 in. in diam.; the *calyx* at its base thick, woody, flat, 1.5 in. across, with 5 spreading triangular lobes.

PERAK: *Wray* 2190; *King's Collector* 5521.

18. *DIOSPYROS PAUCIFLORA*, King & Gamble, n. sp. A glabrous shrub or small tree; young branches rather thinner than a goose-quill, their bark dark and rough. *Leaves* rather large, alternate, very coriaceous; oblong-lanceolate or -oblanceolate, shortly caudate-acuminate, the base slightly cuneate; upper surface olivaceous, shining, lower ochraceous, dull; main-nerves 8 to 10 pairs, spreading, curved, and interarching boldly .1 or .2 in. from the slightly recurved edge; length 5 to 10 in., breadth 1.75 to 3 in.; petiole .25 to .3 in., corrugated. *Male flowers* .3 in. long, sessile and in sessile axillary fascicles of from 3 to 6. *Calyx* .25 in. long, narrowly tubular, somewhat narrowed at base and apex, coriaceous, pale in colour, the mouth with 4 broad triangular short erect lobes, outer surface with a layer of minute adpressed tawny tomentum and scattered over it many black adpressed hairs; the interior paler, pustular, with a few similar scattered hairs and a thick ring of them near the base surrounding the rudimentary ovary and clothing it also. *Corolla* slightly longer than the calyx, fleshy, widely tubular, divided for half its length into 4 broad obtuse lobes with a broad line of adpressed black hairs along the midrib of each outside, the rest of the outer surface adpressed-sericeous, the interior quite glabrous. *Stamens* 12, viz., 8 in pairs standing face to face and united by their short filaments, and 4 free; anthers of all linear, densely hairy, on short glabrous filaments. *Female flowers* not seen.

PERAK: *King's Collector* 7363, 7749.

19. *DIOSPYROS ELLIPSOIDEA*, King & Gamble, n. sp. A tree or shrub; young branches somewhat thinner than a goose-quill, deciduously and densely rusty-puberulous. *Leaves* alternate, thinly coriaceous; oblong to elliptic-oblong, rarely slightly oblanceolate, apex acute, base rounded; both surfaces when dry olivaceous-brown, the upper glabrous, the midrib sometimes rusty-puberulous, the lower surface darker, minutely puberulous; midrib and 10 to 12 pairs of curved ascending nerves faintly prominent on the lower and depressed on the upper surface; length 6 to 10 in.; breadth 2.25 to 3.5 in.; petioles .25 to .3 in. *Male flowers* in dense axillary cymes of 6 to 12, not much longer than the petioles; bracteoles few, broad, densely rusty-tomentose. *Calyx* sub-sessile, tomentose externally, glabrous internally, divided into 4 sub-rotund blunt lobes. *Corolla* glabrous, very fleshy towards the apex, with 4 broad deep lobes. *Stamens* at the base of the tube, broadly ovate, apiculate, filaments flattened. *Female flowers* in subsessile clusters of 3 or 4. *Calyx* with 4 rounded lobes, reflexed, coriaceous, and in fruit only .35 in. across. *Fruit* ellipsoid, glabrous, crowned by the short style and subtended by the reflexed broadly-lobed small calyx, 1 to 1.25 in. long and .8 in. in diam. *Seeds* few, ellipsoid, apiculate, two of the sides compressed.

PERAK: *King's Collector* 2233, 3250, 7098, 7269, 7320, 7689, 8215; *Scortechini* 1615.

20. *DIOSPYROS WALLICHII*, King & Gamble. A tree 30 to 60 feet high; young branches covered with minute coarse hair, the older verrucose. *Leaves* alternate, coriaceous; oblong or elliptic-oblong, apex acute, base cuneate or rounded; edges slightly recurved; upper surface glabrous and shining, lower paler, minutely pubescent at first but becoming glabrescent, both olivaceous when dry; midrib depressed on the upper surface, bold on the lower; main-nerves 14 to 18 pairs, slightly curved, spreading, prominent on the lower surface, faint on the upper; length 8 to 14 in., breadth 2.5 to 5 in.; petiole .5 to .75 in. *Male cymes* .5 to .75 in. long, in clusters (often crowded) on the branches, 7-10-flowered; bracteoles broad, blunt, concave, thick like the calyx and corolla, and like them densely rusty-tomentose externally. *Calyx* .1 to .15 in. long, tubular; the mouth with 4 blunt triangular erect teeth; tomentose on both surfaces. *Corolla* thrice as long as the calyx; narrowly tubular, glabrous inside. *Stamens* 16, in 2 rows, the inner attached to the outer at the bases of their filaments; all linear; rudimentary ovary small, hairy. *Female flower* rather larger than the ♂, but in smaller cymes; the *calyx* tetragonous and deeply grooved, very fleshy, becoming woody, very large and boldly 4-angled and



grooved in the ripe fruit. *Corolla* as in the ♂, but somewhat longer. *Staminodes* about 16. *Ovary* conical densely hairy; stigma glabrous, with 4 deep oblong truncate lobes. *Fruit* 1 in. in diam., nearly twice as much across the calyx, sub-globose, deeply immersed in the large thickened calyx, its apex truncate-concave; seeds 4 or 5. *D. macrophylla*, Wall. Cat. 4141 (not of Blume). *D. undulata*, Wall. A. DC. Prod. VIII. 233; Hiern in Trans. Camb. Phil. Soc. XII. 216 (in part); Kurz in Journ. As. Soc. Beng. XLVI. ii. 23, and For. Fl. II. 135 (in part); Clarke in Hook. fil. Fl. Br. Ind. III. 568.

PENANG: *Curtis* 1085; *Ridley* 7174. MALACCA: *Maingay* (K.D.), 974; *Griffith* (K.D.) 3636. PERAK: *Scortechini* 1976; *Wray* 2535, 2865. *King's Collector* 2966, 2982, 4058, 6779, 7459, 7619, 10123. KEDAK: *Curtis* 2594. SELANGOR: *Ridley* 2748, 8544.

This is the plant issued by Wallich as No. 4141 of his Catalogue under the name *D. macrophylla*. Being different from the older *D. macrophylla* of Blume, a new name had to be found for it. This was done by De Candolle, who reduced it, as a variety, to Wallich's *D. undulata* with the type specimen of which in Wallich's own herbarium it does not agree. De Candolle was followed by Hiern, Kurz, and Clarke; we now restore it to specific rank. The true *D. undulata*, Wall., is a Burmese species. It is found also in the Andaman Islands, but it has not as yet been collected in Malaya.

21. *DIOSPYROS ARGENTEA*, Griff. Notul. IV. 288 (1854). A tree 15 to 50 feet high; young branches about as thick as a goose-quill, covered with sub-deciduous yellowish silky hairs. *Leaves* large, coriaceous; oblong, apex acute, base rather abruptly cuneate or rounded; upper surface warm brown when dry, glabrous and shining, the midrib depressed; lower densely covered with yellowish adpressed sericeous hair, the midrib very stout; main-nerves invisible on both surfaces; length 6 to 10 in.; breadth 1.65 to 3.5 in.; petioles .1 to .25 in. *Male flowers* in somewhat supra-axillary few-flowered shortly pedunculate spike-like cymes 1 to 1.25 in. long (peduncle included); bracts ovate .2 in. long. *Calyx* .25 in. long, deeply 4-lobed, villous. *Corolla* .35 in. long, tubular, lobed half-way down, very villous outside. *Stamens* 20 to 24. *Female flower* solitary on a peduncle .2 in. long; calyx campanulate, .5 in. long, with ovate lobes. *Corolla* .65 in. long. *Staminodes* 4 to 5. *Ovary* 4-celled, 8-ovuled, densely hairy; styles 4, erect, hairy. *Fruit* ellipsoid, apiculate, 2 to 2.5 in. long and 1 to 2 in. in diam., densely rusty-tomentose; the *calyx* persistent, its lobes enlarged, broad, very coriaceous, shortly hairy. Hiern in Trans. Camb. Phil. Soc. XII. 262; Clarke in Hook. fil. Fl. Br. Ind. III. 569. *D. discolor*, Wall. Cat. 4131 (not of Willd.).

MALACCA: *Griffith* (K.D.) 3625; *Maingay* (K.D.) 968, 970; *Goodenough*

1301, 1476. SINGAPORE: *Ridley* 3648, 5898; *Hullett* 825. PERAK: *Wray* 172, 1392; *King's Collector* 4812, 5862, 6387, 6896, 8003, 8142; *Scortechini* 498. PANGKORE: *Curtis* 1365. SELANGOR: *Ridley* 10271. PAHANG: *Ridley* in Trans. Linn. Soc. Ser. 2, III. 318 in Tahan woods.

22. *DIOSPYROS RIGIDA*, Hiern in Trans. Camb. Phil. Soc. XII. 257 (1873). A tree 30 to 60 feet high; young branches as thick as a goose-quill, minutely dark rusty-tomentose. *Leaves* alternate, very coriaceous, large; oblong or elliptic-oblong, equal-sided, the apex sub-acute, the base rounded and neither oblique nor cordate; upper surface dark olivaceous-brown when dry, shining, minutely reticulate; lower paler olivaceous-brown, covered except the midrib with a very thin film of minute tomentum, minutely reticulate; midrib very bold on the lower surface, pubescent at the sides, slightly depressed on the upper; main-nerves 14 to 20 pairs, spreading, interarching .35 in. from the edge, slightly distinct on the lower surface, invisible on the upper; length 10 to 18 in., breadth 2 to 4 in.; petiole .4 to .6 in., very stout. *Male flowers* when in bud .4 in. long and nearly .3 in. in diam., few, in short extra-axillary cymes, densely covered with black tomentum; the pedicels stout, deflexed, about .75 in. long. *Calyx* densely tomentose, ovoid, tapered to the apex, its mouth with 4 broad shallow blunt teeth. *Corolla* (apparently) not much longer than the calyx, very coriaceous, glabrous, the tube ovoid; the lobes short, oblong, blunt. *Stamens* about 20, inserted at the base of the tube, unequal; anthers lanceolate, apiculate, almost sessile. *Female flowers* unknown. Ripe fruit in cymes, depressed-globose, glaberrulous, with a woody rind, 1.75 in. in length from base to apex and 2 in. in diam.; remains of style none; *calyx* at base of fruit cupular, 1.5 in. across, divided into 4 reticulate leathery spreading broadly ovate lobes; peduncle .75 to 1.25 in. long, with dark hispid hairs.

PERAK: *King's Collector* 4024, 5732, 5971, 6801; *Wray* 3708.—  
DISTRIB. Borneo.

23. *DIOSPYROS HORSFIELDII*, Hiern in Trans. Camb. Phil. Soc. XII. 193 (1873). A tree 20 to 40 feet high, all parts except the cymes glabrous; young branches thinner than a goose-quill, pale. *Leaves* alternate, coriaceous; oblong-elliptic or ovate-oblong, apex sub-acute, base slightly cuneate or rounded, the edges slightly recurved when dry; upper surface when dry olivaceous-green, lower surface brown; the midrib and nerves depressed; the reticulations, midrib, and 8 to 14 pairs of curved spreading main-nerves very bold and prominent; length 6 to 10 in., breadth 2.5 to 4 in.; petioles .35 in. *Cymes* 2 to 3 in. long,

covered with black pubescence, few-flowered, collected on extra-axillary or axillary tubercles, sometimes forming small panicles, consisting mostly of ♂ flowers, and often with only a few ♀, with many oblanceolate blunt bracts .25 to .3 in. long, and some smaller bracteoles; branches of the cyme striate when dry. *Calyx* .15 in. long, divided to its base into 4 broadly ovate undulate lobes. *Corolla* in bud cylindric, tetragonous at the base; about .4 in. long, tomentose, deeply divided into 4 narrowly elliptic blunt lobes. *Stamens* about 16 in 2 rows, united into a tube, the anterior row smaller than the posterior, all narrow and apiculate, the filaments short and hairy. *Female flowers* like the ♂ as to calyx, but with corolla somewhat longer and with about 12 flat staminodes. *Ovary* ovoid-conic, tomentose, attenuated into a long style. *Stigma* with several small lobes; ovary 8-celled. *Fruit* when ripe ovoid-globular, 1 to 1.25 in. in diam., glabrescent, subtended by the accrescent calyx with large reticulate undulate lobes. *Seeds* compressed, oblong. Clarke in Hook. fl. Fl. Br. Ind. III. 571. *D. frutescens*, Hassk. Pl. As. Rar. 467 (not of Blume).

MALACCA: Griffith (K.D.) 3620. PERAK: Scortechini 1765; King's Collector 8261.—DISTRIB. Java.

Specimens of this sent from Herbarium Koordersianum, Buitenzorg, have pentamerous flowers; but in other respects they do not differ from the Perak specimens in Herb. Calcutta.

24. *DIOSPYROS TOPOSIOIDES*, King & Gamble, n. sp. A glabrous tree 15 to 40 feet high, sometimes only a shrub; young branches rather thinner than a goose-quill, pale brown and striate when dry. *Leaves* alternate, coriaceous; oblong-elliptic, shortly acuminate or acute, base rounded; edges slightly recurved when dry; both surfaces pale olivaceous when dry, minutely but distinctly reticulate, the upper shining, the lower darker and dull; midrib channelled on the upper surface, strong and prominent on the lower; main-nerves 16 to 20 pairs, spreading, little-curved, interarching far from the edge, the intermediate nerves nearly as prominent; length 7 to 11 in.; breadth 2 to 4 in.; petiole .3 to .4 in. long, stout, wrinkled when dry like the midrib. *Male flowers* .25 in. long, on pedicels longer than themselves, in cymose axillary panicles about 1 in. in length. *Calyx* coriaceous, glabrous, campanulate, with wide truncate entire or sub-entire mouth. *Corolla* slightly exceeding the calyx, ovoid, inflated below, contracted to the 4-toothed apex. *Stamens* numerous, linear, slightly auricled at the base, filaments very short. *Female flowers* when in bud .3 in. long, conical. *Calyx* acutely 4-angled in bud; the 4 lobes deltoid, very coriaceous, puberulous outside, rusty-tomentose inside like the ovary and young

fruit, accrescent in fruit. *Corolla* slightly longer than the calyx, tubular, with 4 short erect ovate lobes, quite glabrous. *Staminodes* about 12, flattened, villous behind. *Ovary* conical, densely rusty-tomentose. *Stigma* glabrous, short, with 8 small lobes. *Fruit* in cymes, depressed-globular, 1 to 1.25 in. in diam., much exceeding the minutely reticulate calyx, glabrescent, minutely tuberculate. *Seeds* compressed.

PERAK: *King's Collector* 4106, 4361, 4889, 5769, 8242, 8357; *Scortechini*; *Ridley* 3079, 10302?

The leaves of this in texture and reticulations much resemble those of *D. Toposia*, Ham. The flowers and inflorescence are, however, different from those of that species.

25. *DIOSPYROS OLEIFOLIA*, Wall. Cat. 4128 (1829). A tree; young branches twice as thick as a crow-quill, almost black when dry, sparsely pubescent. *Leaves* coriaceous, alternate; narrowly oblong to elliptic, sub-acute or acute, the base cuneate; upper surface pale olivaceous, glabrous, shining; the lower yellowish, dull, for the most part glabrous, but usually with sparse adpressed black detachable hairs near the midrib and base; main-nerves invisible on either surface; midrib strong on the lower surface, slightly depressed on the upper, length 6.5 in.; breadth 2 in.; petiole .25 in. long. *Male cymes* on axillary peduncles about .3 in. long, each bearing 3 unequally pedicellate flowers .5 in. long; all very dark in colour and with black hairs like those on the outer surface of the calyx. *Calyx* .4 in. long, tubular-campanulate, densely adpressed rusty-tomentose inside, cut half-way down into 4 triangular erect lobes. *Corolla* tubular, slightly longer than the calyx, very thick, densely tomentose like the interior of the calyx; its lobes 4, very thick, oblong, spreading slightly. *Anthers* attached near the base of the tube, 16, linear-lanceolate, sessile. *Female flowers* on longer panicles than the males; pedunculate calyx with 4 triangular acute lobes, velvety outside, tawny-tomentose inside. *Fruit* depressed-globose, 1.35 in. in diam.; the pericarp woody, glabrous when ripe, tawny-tomentose when young, the persistent *calyx* at its base thick, woody, nearly 1 in. in diam., with dark tomentum outside. A. DC. Prod. VII. 132; Kurz in Journ. As. Soc. Beng. XLI., Pt. II. 72, id. XLVI., Pt. II. 235, and For. Fl. II. 132; Hiern in Trans. Camb. Phil. Soc. XII. 204; Clarke in Hook fil. Fl. Br. Ind. III. 567.

PENANG: *Curtis* 1573. PERAK: *King's Collector* 3876; *Scortechini*. —DISTRIB. Burma, Java.

26. *DIOSPYROS BRACHIATA*, King & Gamble, n. sp. A glabrous tree



20 to 40 feet high; young branches half as thick as a goose-quill. *Leaves* alternate, coriaceous; elliptic-oblong, acute or shortly acuminate, the base slightly cuneate or rounded; upper surface pale olivaceous when dry, lower pale brown; main-nerves 10 to 12 pairs, curved, ascending, prominent like the midrib on the lower surface, depressed somewhat on the upper; length 5.5 to 9 in.; breadth 1.5 to 2.5 in.; petioles .3 to .5 in. *Male flowers* about .5 in. long. *Calyx* .2 in. long, campanulate, divided almost to the base into 5 ovate-acute erect lobes, each folded vertically along the midrib so as to form a deep dorsal groove, everywhere minutely rusty-tomentose. *Corolla* twice as long as the calyx, narrowly tubular; the tube 5-angled, externally divided, the 5 lobes twice as long as the tube, linear-oblong, contorted in aestivation, the external half of each lobe tawny-tomentose, the inner half and the whole of the anterior surface glabrous. *Stamens* 14, linear, apiculate, sub-sessile. *Female flowers* .4 in. long, collected in compound umbellate axillary cymes 1.5 to 1.75 in. long and about as much across, the branches compressed, rusty-puberulous, spreading, bearing a few oblong obtuse bracts; flower-pedicels varying in length from .1 to .2 in., bibracteolate. *Calyx* fleshy, tomentose outside, deeply divided into ovate-acuminate erect grooved lobes. *Corolla* tubular, tomentose outside, glabrous inside, very thick, deeply divided into 4 oblong lobes. *Staminodes* about 8, lanceolate, flattened. *Ovary* ovoid, tapering into a short style, tomentose. *Fruit* depressed-globose, puberulous, .75 to .9 in diam., and about the same from below the calyx to the somewhat concave apex; *calyx* woody, thick, 1 in. wide, with triangular deeply grooved sub-acute lobes.

PENANG: *Curtis* 1453, 1454, 10230.

27. *DIOSPYROS PANICULATA*, Dalz. in Hook. Kew Journ. IV. 109 (1852). A tree 50 to 70 feet high; young branches less than half as thick as a goose-quill, rusty-puberulous. *Leaves* thinly coriaceous, alternate; elliptic or elliptic-oblong, shortly and bluntly apiculate or acuminate; the base cuneate or rounded; both surfaces pale olivaceous when dry, the reticulations minute and distinct, especially on the glabrous upper surface; main-nerves 5 to 8 pairs, curving upwards and forming arches far from the edge, bold like the midrib on the lower surface and slightly depressed on the upper; lower surface softly pubescent; length 4 to 7.5 in., breadth 1.65 to 2.5 in.; petiole .25, stout, channelled, pubescent. *Male and female flowers* not seen. *Fruit* in lax racemoid cymes, ellipsoid, crowned by the small remains of the style, rufous-hirsute when young, ultimately glabrous, 1.5 in. long and 1 in. in diam.; the accrescent calyx at its base with 4 large broadly ovate membranous lobes with many vertical nerves and numerous distinct

minute reticulations, each lobe 1.25 long and nearly as wide. Dalz. & Gibbs. Flora Bombay, 141; Bedd. Ic. Pl. Ind. Or. t. cxxv, and Fl. Sylv. Madr. cxliv; Hiern in Trans. Camb. Phil. Soc. XII. 190; Clarke in Hook. fil. Fl. Br. Ind. III. 570.

PERAK: *King's Collector* 7637, 8163.

The scanty specimens from Perak are in fruit only, but the leaves and fruit agree so well with those of *D. paniculata*—a species hitherto known only from the west of the Indian Peninsula—that, in spite of the anomalous geographical distribution, we, temporarily at least, refer the Perak specimens to that species.

28. *DIOSPYROS KUNSTLERI*, King & Gamble, n. sp. A tree 20 to 40 feet high; young branches as thick as a goose-quill, glabrous. *Leaves* alternate, large, thickly membranous; elliptic to elliptic-oblong, acute, the base rounded; both surfaces, when dry, olivaceous-brown, the lower rather darker than the upper, somewhat shining, faintly reticulate; main-nerves 8 to 12 pairs, much curved, spreading, ascending, and forming wide arches .25 in. from the edge, prominent on the lower surface like the midrib, somewhat depressed on the upper; length 8 to 12 in., breadth 3.5 to 4.5 in.; petioles .25 to .35 in. *Male flowers* unknown. *Female flowers* in short axillary and extra-axillary puberulous cymes, nearly 1 in. long, pedicellate; bracts narrow, nearly as long as the pedicels, oblong. *Fruit* in short stout cymes (unripe) depressed-globular, crowned by the short remains of the style, with 4 or 5 vertical ridges, everywhere densely rusty-tomentose, subtended by the accrescent almost woody calyx, with 4 deep reniform-cordate apiculate erect undulate lobes.

PERAK: *King's Collector* 4343, 7633, 8229.

29. *DIOSPYROS NUTANS*, King & Gamble, n. sp. A shrub or small tree 8 to 16 feet high; young branches less than one-third as thick as a goose-quill, deciduously villous, the older much thicker with deeply channelled dark-coloured, sub-glabrous bark. *Leaves* alternate, thinly coriaceous; oblong or sub-oblong-oblong, apex shortly caudate-acuminate, the base rounded; both surfaces brown when dry, the upper glabrous, the lower puberulous, but often villous on the prominent midrib; main-nerves 7 to 10 pairs, curved, ascending, interarching near the margin, the reticulations distinct; length 5 to 7 in., breadth 1.5 to 2.25 in.; petiole .15 in. *Cymes* umbellate, few-flowered, borne on the apices of slender slightly supra-axillary flexuous puberulous peduncles much longer than the leaves (often twice as long); bracteoles few, small, lanceolate, concave. *Male flowers* in different cymes from the females, .5 in. long, on short pedicels less than .1 in. long. *Calyx* puberulous, campanulate, with 5 long lanceolate lobes. *Corolla* four times as long

as the calyx, narrowly tubular, slightly constricted at the throat, hairy outside, glabrous inside; the limb with 5 deep oblong lobes. *Stamens* 10, linear-elliptic, apiculate, inserted in the bottom of the tube, 5 sessile and 5 with filaments. *Female flowers* shorter than the ♂, with small filamentous staminodes. *Ovary* narrowly ovoid, densely rufous-hirsute, attenuated into a long pubescent style crowned by 5 short glabrous reflexed small stigmas. *Fruit* narrowly ellipsoid, sparsely hairy, .6 to 1 in. long and .5 in. in diam., crowned by the persistent style and subtended by the non-acrescent calyx. *Seeds* few, narrowly ellipsoid.

PERAK: *Scortechini* 674, 1678; *King's Collector* 378, 2675, 2987, 3573, 7087.

Differs from all the other Malayan species by its long peduncled pendulous inflorescence.

#### SPECIES IMPERFECTLY KNOWN.

30. *DIOSPYROS REFLEXA*, King & Gamble, n. sp. A tree 50 to 70 feet high; young branches as thick as a goose-quill, covered with a layer of minute deciduous rusty pubescence. *Leaves* alternate, thickly coriaceous; oblong to elliptic, shortly acuminate, the base cuneate; upper surface olivaceous-brown when dry, the lower pale brown, both minutely reticulate; main-nerves 8 to 10 pairs, spreading, interarching .15 in. from the slightly recurved edges; length 5 to 7.5 in., breadth 1.75 to 3 in.; petiole .4 or .5 in. *Flowers* unknown. *Fruit* hemispheric with depressed truncate apex, under 1 in. in diam.; the calyx embracing the very base of the fruit with 4 fleshy much reflexed revolute triangular fleshy lobes, densely rusty-tomentose like the fruit.

PERAK: *King's Collector* 7676, 7747.

The curious fleshy calyx with much-reflexed lobes distinguishes this from all the other Malayan species.

31. *DIOSPYROS PENANGIANA*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, covered with deciduous hair of two sorts, namely, a uniform coat of minute rusty tomentum with long rusty bristle-like hairs protruding through it. *Leaves* alternate, coriaceous; oblong, shortly and bluntly acuminate, narrowed below the middle to the rather broad auriculate cordate base; upper surface when dry pale brown, shining, glabrous except the puberulous depressed midrib; lower surface reddish-brown, transversely reticulate, with pubescence like that of the young branches on the stout midrib and 10 to 14 pairs of ascending rather straight main-nerves, otherwise glabrescent; length 5.5 to 7.5 in., breadth 1.25 to 2.25 in.; petioles .15 to .2 in. long, hispid. *Male and female flowers* unknown.

*Fruit* sessile, globular, from .75 to 1 in. in diam., densely covered with minute rufous tomentum, crowned by the short remains of the style and subtended by the small calyx with 5 broad reflexed lobes.

PENANG : *Curtis* 2221.

Collected only in Penang. In leaves this resembles the Bornean plant named by Hiern *Maba ? cordata*. The 5-cleft calyx of this is suggestive rather of *Diospyros* than of *Maba*.

32. *DIOSPYROS RUFA*, King & Gamble, n. sp. A tree 60 to 80 feet high; young branches about half as thick as a goose-quill or thicker, glabrous, brown and rough when dry. *Leaves* alternate, thickly coriaceous; oblong-elliptic, sometimes oblanceolate, the apex shortly and bluntly acuminate, the base much narrowed; upper surface warm brown when dry, glabrous, very shining; the lower dull, glabrous or slightly puberulous towards the base; main-nerves 7 to 10 pairs, spreading, little curved, interarching near the slightly incurved edges, slightly prominent on the lower surface and somewhat depressed on the upper when dry; length 5.5 to 7.5 in., breadth 1.75 to 2.25 in.; petioles .4 to .6 in., stout, channelled. *Male and female flowers* unknown. *Fruit* globular-ovoid, blunt, 1.25 to 1.5 in. long and about 1.15 in. in diam., densely rusty-tomentose. *Calyx* at base flat, 4-angled, .4 in. in diam., rusty-tomentose.

PERAK : *King's Collector* 3330, 4945, 5409, 6712.

33. *DIOSPYROS AREOLATA*, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches thinner than a goose-quill, rusty-puberulous becoming glabrous. *Leaves* alternate, very coriaceous; oblong, sub-acute, the base rounded; both surfaces glabrous except the puberulous midrib and sometimes the main-nerves, hepatic-brown when dry; the upper shining, minutely and faintly areolate; the lower dull and boldly areolar-reticulate; midrib bold on the lower surface, slightly depressed on the upper; main-nerves about 7 pairs, curved, ascending abruptly, faint on the lower surface, almost invisible on the upper; length 4.5 to 6 in.; breadth 1.5 to 1.75 in.; petioles .5 or .6 in. *Male flowers* (only buds seen) under .5 in. in length, collected near the ends of the branches in tomentose cymes .5 to 1 in. long. *Calyx* coriaceous, on a thick pedicel shorter than itself, ovoid in bud; the mouth with triangular short teeth. *Corolla* like the calyx, but glabrous and fleshy. *Stamens* about 21; anthers linear, apiculate, nearly uniform, sub-sessile or on short broad flat filaments, sometimes slightly attached in groups of 3. *Female flower* probably solitary, much broader than the ♂. *Calyx* velvety outside and inside, divided nearly to the base into 4 ovate-triangular very acute lobes .4 in. long. *Corolla* fleshy, glabrous, .6 in. long, its



tube wide with staminodes like the anthers of the ♂ but not so numerous; limb about as long as the tube, with 4 deep, broad, subquadrate spreading lobes. *Ovary* ovoid-conic, densely rusty-pilose. *Stigmata* 4, oblong, fleshy, glabrous. *Fruit* unknown.

PERAK: *Scortechini* 476; *King's Collector* 5813.

34. *Diospyros CURTISII*, King & Gamble, n. sp. A tree (?); young branches rather thicker than a goose-quill, rugulose and dark-coloured when dry, glabrous. *Leaves* alternate, thinly membranous; oblong or oblong-elliptic, shortly and bluntly acuminate, base rounded or slightly cuneate; both surfaces glabrous, the upper olivaceous when dry, the lower brown; main-nerves 7 to 9 pairs, slightly curved, ascending, faint on both surfaces; the midrib prominent on the lower surface, slightly so on the upper; length 2·5 to 5 in., breadth 1·25 to 2 in.; petioles ·2 in. *Male flowers* not seen. *Female flowers* ·25 in. long, in extra-axillary or axillary fascicles of about 3 on the younger branches; pedicels about ·2 in. long, cinerous-pubescent, each with 2 oblong obtuse bracteoles at its base, about ·5 in. long. *Calyx* coriaceous, nearly ·2 in. broad at the base, deeply divided into 4 triangular-reniform glabrescent lobes. *Corolla* partially glabrous, about as long as the calyx, salver-shaped; tube short; limb divided into 4 deep, broadly ovate, spreading lobes. *Staminodes* about 4, linear-lanceolate, compressed. *Ovary* narrowly oblong, tapering into the short thick style, densely tawny-tomentose. *Fruit* unknown.

PULAU POONGAH: *Curtis* 2942.

35. *Diospyros GLOMERULATA*, King & Gamble, n. sp. A tree 40 to 60 feet high; young branches rather thicker than a crow-quill, densely clothed with minute rufous pubescence. *Leaves* membranous, alternate; elliptic, shortly and bluntly apiculate, the base rounded or slightly cuneate; upper surface olivaceous when dry, glabrous; the lower brown, puberulous, midrib bold; main-nerves 5 or 6 pairs, slightly curved, ascending; length 2·25 to 3·5 in., breadth 1·25 to 1·75 in.; petiole about ·1 in. *Male flowers* ·2 in. long, crowded in dense sessile axillary and extra-axillary globular capitules ·4 in. across. *Calyx* sessile, campanulate, tomentose, deeply divided into 4 broadly triangular subacute erect lobes. *Corolla* tubular, tetragonous, thick, about as long as the calyx; tube glabrous, the 4 lobes pubescent outside, oblong. *Stamens* 8, separate. *Anthers* broadly lanceolate, apiculate, filaments short. *Female flowers* and *fruit* not known.

PERAK: *King's Collector* 8590.

The following description of a *Diospyros* from Pahang is taken from Ridley's account of the Flora of the Eastern Coast of the Malay Peninsula.

36. *Diospyros caliginosa*, Ridley in Trans. Linn. Soc. Ser. 2, III. 318 (1893). A graceful lofty tree; bark black; branches pubescent. *Leaves* alternate, elliptic-oblong, acute; 8 in. long, 3 in. broad; main-nerves 13 pairs; glabrous above, minutely pubescent beneath on the midrib and nerves; petiole .25 in. long, minutely pubescent. *Flowers* on old wood, fascicled; peduncles short, covered with a black pubescence. *Calyx* of ♂ flower patelliform; sepals 4, broadly ovate, obtuse, covered without and on the margin with black hair. *Corolla* urceolate, white, silky, .5 in. long; lobes 4, short, ovate, recurved. *Stamens* 16, collected in pairs; filaments thick, minutely hispid; anthers glabrous, long-conical with acute tips. *Ovary* abortive, 4-lobed, irregular, the lobes furrowed; style conical. Flowers of ♀ not seen. *Fruit* small, globose, surrounded by the accrescent sepals.

PAHANG: in thick woods at Kota Glanggi and Kwala Tembeling, Ridley.

We are unable, having seen no specimen, to make quite sure of the place of this species. It seems to come very near to No. 17 *D. tristis*, King & Gamble.

#### Order LXXIII. STYRACEÆ.

Trees or shrubs. *Leaves* alternate, simple; stipules none. *Flowers* in simple or branched axillary or terminal racemes or spikes, sometimes solitary; usually white, rarely red; bracts small, often minute or obsolete. *Calyx* gamosepalous, the tube more or less adnate to the ovary, so that it may be superior or inferior; limb 4-5-toothed or truncate, persistent. *Corolla* of 4 to 5 petals, the tube usually short, sometimes none; petals imbricate or sometimes valvate or contorted. *Stamens* adnate to the petals, equal in number to them or double or very many; 1-many-seriate; filaments free or connate; anthers round or linear, dehiscing laterally. *Ovary* inferior or superior, 2-5-celled or sometimes, by the separation of the septa, 1-celled; style filiform, sometimes thick; stigma capitate, entire or lobed; ovules 1 or more, on the inner angle of each cell, pendulous or erect. *Fruit* drupaceous, indehiscent, 1-, rarely 2-3-seeded. *Seeds* albuminous, testa thin or coriaceous, hilum generally broad; embryo straight or curved, cotyledons terete or flattened; radicle cylindrical or short.—DISTRIB. Warmer regions of Asia, Australia, and America, absent from Africa; genera 7 or 8, species about 350.

Stamens many, in several series	..	..	..	..	1. SYMPOCOS.
Stamens 10, in one series	..	..	..	..	2. STYRAX.

1. SYMPLOCOS, Linn.

Trees or shrubs. *Leaves* alternate, often turning yellow when dry, entire or toothed. *Flowers* white, sometimes red, in axillary simple or compound spikes or racemes, sometimes in few-flowered fascicles, occasionally reduced to one flower; bracts small, solitary at the base of the pedicels; bracteoles 1 to 3, small, at the base of the flower. *Calyx-tube* adnate, short when in flower, campanulate, often enlarged in fruit; lobes 5, imbricate. *Petals* 5 in one series, or 6 to 10 in two series, free or somewhat connate, or sometimes connate in a tube, imbricate. *Stamens* adnate to the corolla, at the base of the petals or higher up the tube, numerous, many-seriate, the outer the longest; filaments filiform, or sometimes flattened; anthers short, dehiscing in longitudinal parallel cells. *Ovary* inferior, or semi-superior, 2-5-celled; style filiform; stigmas capitate, slightly lobed; ovules 2, pendulous from the inner angle of each cell. *Fruit* an oblong, ovoid or sub-globose drupe; endocarp woody or thin, often ridged or ribbed, 1-3-seeded. *Seeds* usually 1 only (by abortion); embryo terete, straight or curved, in the centre of fleshy albumen; cotyledons much shorter than the radicle.—  
DISTRIB. Warmer regions of Asia, Australia and America, species about 290 to 300.

Filaments more or less pentadelphous; corolla-tube divided nearly to the base (Subg. I. HOPEA):—

Fruit (where known) more or less ampulliform; embryo curved (Sect. i. PALURA):—

Inflorescence compound, branching at any rate at the base:—

Branches of the inflorescence paniculately racemose, drupe nearly .5 in. long .. .. 1. *S. odoratissima*.

Branches of the inflorescence racemose:—

Racemes densely ferruginous-tomentose; pedicels scarcely .05 in. long, thick .. .. 2. *S. fulvosa*.

Racemes ferruginous-villous; pedicels .2 in. long, slender; leaves elliptic, under 4 in. long .. .. 3. *S. nivea*.

Racemes pulverulent; pedicels .2 in. long, slender; leaves obovate .. .. 4. *S. pulverulenta*.

Racemes glabrous or slightly pubescent; pedicels longer than .05 in., slender:—

Leaves over 4 in. long and 2 in. broad; calyx-lobes glabrous .. .. 5. *S. monticola*.

Leaves under 4 in. long and 1.5 in. broad; calyx-lobes pubescent .. .. 6. *S. fasciculata*.

Branches of the inflorescence spicate:—

Leaves beneath and inflorescence glabrous or nearly so; endocarp of seed thin .. .. { 7. *S. spicata*.  
var. *malasica*.

Leaves beneath and inflorescence ferruginous-villous; endocarp of seed hard, bony .. .. 8. *S. ferruginea*.

- Inflorescence simple, racemose; racemes very short, almost reduced to fascicles .. .. 9. *S. Ridleyi*.
- Fruit (where known) ovoid-oblong, not ampulliform; embryo straight (Sect. ii. *LODHRA*):—
- Inflorescence paniculate, branching usually from the base only:—
- Branches of the inflorescence racemose, more than .5 in. long:—
- Leaves glabrous or nearly so; fruit glabrous:—
- Leaf-margins prominently broad-crenate, apex shortly and bluntly acuminate .. .. 10. *S. celastriifolia*.
- Leaf-margins obscurely crenate or entire:—
- Leaf-margins prominently glandular, texture almost coriaceous .. .. 11. *S. adenophylla*.
- Leaf-margins not glandular, texture chartaceous .. 12. *S. perakensis*.
- Leaves very hairy; fruit villous .. .. 13. *S. Brandiana*.
- Branches of the inflorescence racemose, under .5 in. long; leaf-margins entire or nearly so .. .. 14. *S. concolor*.
- Inflorescence unbranched:—
- Inflorescence racemose:—
- Racemes 2 to 3 in. long, slender, few-flowered .. 15. *S. calycodactylos*.
- Racemes very short:—
- Leaves coriaceous, acute or rounded or emarginate at apex; fruit ovoid-oblong, under .5 in. long .. 16. *S. ophirensis*.
- Leaves chartaceous, long-acuminate at apex, cuneate at base; fruit cylindric-oblong, over .5 in. long .. 17. *S. Curtisii*.
- Leaves chartaceous; fruit not known:—
- Leaves 6 to 7 in. long, abruptly acuminate at apex, usually sub-cordate at base, quite glabrous .. 18. *S. crassipes*.
- Leaves 4 to 7 in. long, long acuminate at apex, rounded at base, ferruginous-pilose beneath .. 19. *S. penangiana*.
- Inflorescence spicate:—
- Drupe large, over 1 in. in length; endocarp with 8 prominent sharp ridges; leaves nearly glabrous:—
- Leaves usually under 6 in. long and 2 in. broad; young inflorescence without prominent bracts .. 20. *S. cerasifolia*.
- Leaves usually over 6 in. long and 2 in. broad; young inflorescence prominently bracteate so as to appear strobilate .. .. 21. *S. rigida*.
- Drupe small, under .5 in. long; endocarp with faint ridges only; leaves rusty-pubescent beneath; young inflorescence strobilate .. .. 22. *S. rubiginosa*.
- Filaments connate in a staminal tube; corolla-tube elongate (Subg. II. *CORDYLOBLASTE*):—
- Corolla-tube scarcely .3 in. long .. .. 23. *S. confusa*.
- Corolla-tube about 1 in. long:—
- Inflorescence densely rusty-tomentose; leaves pubescent beneath .. .. 24. *S. Maingayi*.
- Inflorescence slightly grey-pubescent; leaves glabrous .. 25. *S. Scortechinii*.



## Subgenus I.—HOPEA.

1. *SYMPLOCOS ODORATISSIMA*, Choisy ex Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 60 to 70 feet in height and 18 to 24 in. in diam. of stem; branches grey, stout; branchlets dark greyish-brown, angled, striate, minutely puberulous; leaf-buds acuminate, .15 in. long. *Leaves* thinly coriaceous; elliptic or elliptic-obovate or elliptic-oblong, shortly acuminate at apex, cuneate or slightly rounded at base; glabrous on both surfaces; margin entire or serrate, blackish-brown when dry; 3 to 6 in. long, 2 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 8 to 10 pairs, arching upwards to and along the margin where they meet in an intramarginal looped nerve near it; reticulations transverse, not prominent; petiole .4 to .6 in. long, flattened above. *Inflorescence* of grey-pubescent panicles, 1.5 to 2 in. long, axillary to the upper leaves, longer in fruit and stouter; branches paniculately racemose; bracts very small, deciduous; bracteoles 2, below the calyx-tube, ovate-acute, reflexed, .05 in. long; pedicels .15 in. long. *Calyx-tube* .05 in. long, pubescent; lobes 5, as long as tube, rounded. *Corolla-tube* very short; lobes ovate-obtuse, .15 in. long, pubescent on back, ciliate, white. *Stamens* in 5 bundles opposite corolla-lobes, very many, 80 to 100 in all; filaments slender; anthers rounded. *Ovary* villous; style thick, .075 in. long, stigma lobed; cells 3, ovules 2 in each cell. *Fruit* an ampulliform drupe, .4 to .5 in. long, .25 in. broad, lower part rounded, upper cylindrical, crowned by the calyx-rim and connivent lobes, the calyx-rim .075 in. broad; exocarp corky, rusty-brown, slightly pubescent; endocarp hard. *Seeds* 1 to 3, usually 1 only perfect; testa membranous, albumen fleshy; embryo slightly curved, .15 in. long, radicle long. Miq. Fl. Ind. Bat. I. Pt. 2, 468; Koord. & Val. Bijdr. VII. 148; Brand Monog. Sympl. 35. *Dicalyx odoratissimus*, Blume Bijdr. 1116.

PERAK: *King's Collector* 10030, 10411, 10777. SINGAPORE: *Ridley* 4428 (this latter specimen has leaves up to 8 in. long and 3.5 in. broad).—DISTRIB. Sumatra (*Beccari* 834), Java, Borneo (*Beccari* 4014).

This is var. *divaricata*, Brand, which seems to us hardly separable, unless by the leaves being almost entire. In the Java and Sumatra specimens of *G. odoratissima* the leaves are markedly serrate.

2. *SYMPLOCOS FULVOSA*, King & Gamble, n. sp. A very large tree, reaching 150 feet in height (*Scortechini*); branchlets dark-brown, young ones and innovations densely ferruginous-tomentose. *Leaves* chartaceo-coriaceous; elliptic, abruptly long blunt-acuminate at apex the acumen often curved, cuneate or attenuate at base; glabrous and shining above,

glabrous and dull beneath, ferruginous-brown when dry; margins faintly crenate-serrate, with a row of glands, slightly recurved; 3 to 4.5 in. long, 1.25 to 2 in. broad; midrib slender, slightly impressed above; main-nerves 6 to 8 pairs, the lowest pair close to the margin, the rest gradually more distant upwards, curved upwards to and along the margin where they meet in a looped intramarginal nerve; reticulations many, forming an elegant network; petiole .75 in. long. *Inflorescence* of tripartite sessile panicles of racemes, the racemes 1 to 2 in. long, densely ferruginous-tomentose; bracts and bracteoles minute, hidden in the tomentum; pedicels thick, .05 in. long; flowers white, then yellowish. *Calyx-tube* short; lobes very short, rounded, densely tomentose without. *Corolla-tube* short; lobes ovate-oblong, glabrous, .15 in. long, 3-5-nerved. *Stamens* many, obscurely separated in bundles; filaments slender; anthers very small rounded. *Ovary* and disk glabrous, style glabrous, .075 in. long, stigma capitate; cells 3. *Fruit* unknown.

PERAK: *Scortechini* 563, 567.

3. *SYMPLOCOS NIVEA*, Brand Monog. Sympl. 36 (1901). A tree, reaching 50 to 60 feet in height; branchlets slender, rounded, dark brown, glabrous; leaf-buds ovate-acuminate, tawny-pubescent. *Leaves* chartaceo-coriaceous; elliptic or elliptic-oblong, acute or acuminate at apex, cuneate at base; glabrous and shining above, glabrous and pale beneath, dark olive-brown when dry; margins obscurely undulate-crenate, recurved; 3 to 4 in. long, 1 to 1.75 in. broad; midrib slender, impressed above; main-nerves 5 to 6 pairs, irregularly spaced and often branched, at first straight then curved upwards to and along the margin where they anastomose in a looped intramarginal nerve; reticulations obscure; petiole slender, .3 to .4 in. long. *Inflorescence* an axillary panicle of villous racemes 2 to 3 in. long, the racemes 12-15-flowered; bracts and bracteoles ovate-lanceolate, villous, quickly caducous; pedicels slender, .2 in. long. *Calyx-tube* adnate to the ovary; lobes 5, oblong-obtuse, .1 in. long, glabrous, persistent. *Corolla* pure white; lobes twice as long as those of the calyx. *Stamens* about 60, as long as the corolla. *Ovary* glabrous, 1-celled, ovules apparently 2; style slender from a conical villous base. *Fruit* unknown.

PENANG: at Pulau Boetong, Government Hill and Muka Head, *Curtis* 715.

4. *SYMPLOCOS PULVERULENTA*, King & Gamble, n. sp. A tree (?); ultimate branchlets and inflorescence grey- or golden-pulverulent-scaly; leaf-buds lanceolate-acuminate. *Leaves* membranous; obovate, abruptly short acuminate at apex, cuneate often unequally at base; glabrous on both surfaces except on the nerves, olive-green when dry; margins

entire; 5 to 7 in. long, 2 to 3 in. broad; midrib slender, impressed above; main-nerves 8 to 9 pairs, curving upwards to and along the margin; reticulations transverse, prominent and slightly raised above; petiole .7 to .8 in. long, smooth, pulverulent-pubescent. *Inflorescence* of axillary panicles of racemes about 2 in. long; main rachis .7 in. long; branches sub-opposite, about 2 pairs, .5 to 1 in. long; bracts short, ovate, caducous; bracteoles 2, ovate-acute, under the calyx-tube; pedicels slender, .15 to .2 in. long; flowers yellow, buds globose. *Calyx-tube* funnel-shaped, .06 in. long; lobes 5, short, rounded. *Corolla-tube* short; lobes 5, ovate, obtuse, pulverulent-pubescent. *Stamens* very numerous, probably 200 at least, in 5 bundles opposite the corolla-lobes; filaments slender; anthers very small, rounded. *Ovary* and disk pubescent; style stout, stigma capitate; cells 2, ovules several. *Fruit* not known.

SINGAPORE: at Chanchukam, Ridley 4786.

5. *SYMPLOCOS MONTICOLA*, King & Gamble, n. sp. A shrub or small tree reaching 20 feet in height and 3 in. in diam. of stem; branchlets somewhat slender, pale brown, sinuous; leaf-buds small, acuminate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces, greenish-brown when dry; margins serrate except near the base, slightly recurved; 4 to 6 in. long, 2 to 2.5 in. broad; midrib slender, pale, impressed above; main-nerves 6 to 8 pairs, close near the base, gradually more distant, curved upwards to meet in a looped intramarginal nerve; secondary nerves few, reticulations transverse; petiole .25 in. long, channelled above. *Inflorescence* a fascicle of racemes either from the axils of leaves a little below the last, or from the new wood below them; racemes .5 to 1.5 in. long, 6-8-flowered, all parts nearly glabrous; bracts ovate, very minute; pedicels 0 to .1 in. long; bracteoles 2, ovate, acute, ciliate, .05 in. long, at the base of the calyx-tube. *Calyx-tube* short; lobes as long (.1 in.), thin, glabrous, round. *Corolla-tube* very short; lobes 5, thin, oblong, obtuse, .2 in. long, 3-nerved. *Stamens* many, more than 80, in 5 bundles opposite the corolla-lobes; filaments slender; anthers rounded. *Ovary* and disk glabrous or slightly pubescent; style short, .1 in. long; stigma capitate; cells 3. *Fruit* not known.

PERAK: *Scortechini* 533; *King's Collector* 3804, 6927, in dense jungle on the summits of mountains at 4,000 to 4,600 feet.

6. *SYMPLOCOS FASCICULATA*, Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 40 to 50 feet in height and 10 to 15 in. in diam. of stem; branchlets pale greyish-brown, slender, innovations greyish-pubescent. *Leaves* thinly chartaceous or membranous; oblong-lanceolate, long acuminate at apex, the acumen curved and mucro-

nate, rounded or obtusely rhomboid at base; glabrous and shining above, glabrous beneath except on the midrib, yellowish when dry; margins entire or obscurely and distantly serrate, slightly recurved; 2 to 4 in. long, .7 to 1.5 in. broad; midrib slender, impressed above, minutely pilose beneath; main-nerves about 5 to 7 pairs, indistinct, curved upwards and meeting in an intramarginal looped nerve rather distant from the margin; secondary nerves and reticulations slender, obscure; petiole .2 in. long, bordered above by the decurrent margin of the blade and minutely pilose. *Inflorescence* a short fascicle of axillary cymes or racemes .5 to .7 in. long, ashy-pubescent; bracts very minute; pedicels slender, .15 in. long; bracteoles 3, minute, ovate, acute, ciliate. *Calyx-lobes* 5, rounded, obtuse, .05 in. long, pubescent without. *Corolla-lobes* oblong, obtuse, .1 to .15 in. long, glabrous, 5-nerved; tube very short or almost none. *Stamens* in 5 bundles opposite the corolla-lobes, about 20 to 25 or sometimes more; filaments slender, outer ones exsert; anthers minute, rounded, emarginate. *Ovary* depressed at top, disk glabrous, cells 3; style slender, .075 in. long, ending in a flattened 3-lobed stigma. *Fruit* an ampulliform drupe, ovoid below for .2 in. in length, .15 in. in diam., glabrous, 5-6-ribbed, tipped by a cylindric beak .05 in. long and by the persistent calyx-lobes; exocarp thin, endocarp hard, furrowed, furnished within with 3 to 6 strong ribs, enclosing a much-lobed seed; testa thin; albumen fleshy; embryo very slightly curved, .15 in. long. *Miq.* Fl. Ind. Bat. I. Pt. 2. 467; *Clarke* in Hook. f. Fl. Br. Ind. III. 574; *Koord. & Val. Bijdr.* 7. 150; *Brand Monog. Sympl.* 34. *Dicalyx tinctorius*, Bl. Bijdr. 1116.

PENANG: *Curtis* 3171. PERAK: *Wray* 1865, 2418, 2466, 2739, 3561; *Scortechini* 128, 1527; *King's Collector* 1042, 2021, 3003, 4739, 5175, 5337, 10525. SELANGOR: *Ridley* 8209. MALACCA: *Maingay* (K.D.) 958; *Griffith* (K.D.) 3665; *Holmberg* 867. JOHORE: *G. King*. SINGAPORE: *Murton* 143; *Ridley* 3626A, 8209.—DISTRIB. Sumatra (*Forbes* 2355, 2358, 2563, 2812); Java (*Forbes* 218); Borneo (*Beccari* 2380; *Haviland* 1024, 1545).

After a great deal of trouble the seed with albumen and embryo were separated. The walls of the shell of the fruit are furnished inside with projecting ribs, so that the seed resembles that of a small walnut and the embryo is slightly curved, long and narrow, and might be called straight. *Koorders & Valeton's* description is thus confirmed.

7. SYMPLOCOS SPICATA, Roxb. Hort. Beng. 40 (1814), and Fl. Ind. II. 541; Wall. Cat. 4417; A.DC. Prod. VIII. 254; Wight Ill. t. 150; *Miq.* Fl. Ind. Bat. I. Pt. 2. 465; *Bedd.* Fl. Sylv. Madr. cxlix; *Brandis* For. Fl. 300; *Kurz* in Journ. As. Soc. Beng. XLVI. ii. 239 and For. Fl. II. 146; *Clarke* in Hook. f. Fl. Br. Ind. III. 573; *Trimen* Fl. Ceyl. III. 104;



Cooke Fl. Bomb. II. 108; Koord. & Val. Bijdr. VII. 144. *S. polycarpa*, Wall. Cat. 4423; DC. l.c. 255; Kurz ll.c. *S. Loha*, Don Prod. 144; DC. l.c. 255. *S. racemosa*, Wall. Cat. 4418 (in part, not of Roxb).

VAR. *malasica*, Clarke in Hook. f. Fl. Br. Ind. III. 573. A small tree with spreading branches, reaching 30 to 40 feet in height and 1 foot in diam. of stem; branchlets dark grey-brown, smooth, innovations glabrous; buds lanceolate acuminate. *Leaves* coriaceous-chartaceous, alternate; elliptic- or oblong-lanceolate, acute or acuminate at apex, cuneate at base; entire or serrate, glabrous on both surfaces, turning yellow when dry; margin distantly and slightly denticulate, glandular; 4 to 7 in. long, 1.5 to 2.5 in. broad; midrib thick, impressed above; main-nerves about 10 pairs, irregular, curved upwards and branching towards the margin; secondary nerves few; reticulations prominent on the under surface; petiole .4 to .7 in. long, channelled above. *Inflorescence* an axillary panicle of spikes, the branches mostly near the base; spikes 1.5 to 4 in. long, glabrous or slightly pubescent; bracts very small, deciduous; bracteoles under each flower 3, ovate, acute or obtuse, ciliate, .05 in. long. *Calyx-lobes* 5, rounded, imbricate, glabrous, tube as long as lobes, the latter .05 in. long. *Corolla* 5-lobed, white or yellowish; tube very short; lobes ovate-orbicular, .1 to .15 in. long. *Stamens* indefinite, about 40, the outer ones longer than the petals, inserted on the corolla-tube; filaments slender; anthers short, rounded. *Ovary* inferior, 3-celled; ovules 3 to 4 in each cell; style thick, .1 in. long, stigma capitate. *Fruit* a globose drupe .15 to .2 in. long, surmounted by a rim formed by the short calyx-lobes, smooth, olive-coloured, exocarp and endocarp thin, ribbed. *Seed* 1, testa thin, albumen rather scanty; embryo curved.

PERAK: Wray 2798; Scortechini; King's Collector 6299, 6903. MALACCA: Griffith; Maingay (K.D.) 957; Derry 506.

VAR. *acuminata*, Brand Monog. Sympl. 40. *Leaves* long acuminate, blunt at the tip, serrulate, 3 to 5 in. long, 1 to 2 in. broad; main-nerves 7 to 8 pairs, all nerves and reticulations, except the impressed midrib, prominent on the upper surface in young leaves. *Flowers* sometimes pedicellate. *Fruit* somewhat urceolate, ribbed. *Symplocos acuminata*, Miq. Fl. Ind. Bat. I. Pt. 2. 467. *Dicalyx acuminatus*, Bl. Bijdr. 1119.

PERAK: Scortechini 1556. — DISTRIB. Java, Sumatra (Forbes 3208).

VAR. *attenuata*, Clarke in Hook. f. Fl. Br. Ind. III. 573. *Leaves* long acuminate at apex, long attenuate at base, 3 to 4 in. long, 1 to 1.25 in. broad; margins serrate. Spicate branches of the inflorescence slender, usually short. *Fruit* small, often only .1 to .15 in. in diam.

*S. attenuata*, Wall. Cat. 4426; A. DC. Prod. VIII. 256; Brand Monog. Sympl. 39.

KEDAH: *King's Collector* 1764.—DISTRIB. Assam, Burma.

8. *SYMPLOCOS FERRUGINEA*, Roxb. Hort. Beng. 40 (1814), Fl. Ind. II. 542. A tree with spreading branches reaching 50 to 60 feet in height and 1 foot in diam. of stem; branchlets stout, dark brown, smooth, innovations densely ferruginous-villous. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acuminate at apex, cuneate at base; glabrous and shining above, ferruginous-villous especially on the nerves beneath, turning yellow when dry; margins serrulate, denticulate or almost entire, recurved; 5 to 8 in. long, 1.5 to 3 in. broad; midrib stout, very prominent beneath, impressed above; main-nerves 12 to 14 pairs, prominent beneath, parallel at first and straight for some distance then arching near the margin; secondary nerves few; reticulations obliquely transverse, not prominent; petiole .3 to .5 in. long, densely rusty-villous, thick. *Inflorescence* an axillary panicle of spikes, 2 to 6 in. long, the spikes and panicle short in bud, longer in flower, much elongated in fruit, the branches of the panicle mostly near the base, densely ferruginous-villous; bracts very small, ovate-acute, villous; bracteoles under each flower 3, the central one .12 in. long, ovate-acuminate, the two outer shorter, ovate-acute, the three together as long as the calyx. *Calyx* 5-lobed; lobes ovate-obtuse, .1 in. long, pubescent without. *Corolla* 5-lobed, white, rotate; tube .05 in. long; lobes .1 in. long, oblong-obtuse, 3-nerved. *Stamens* indefinite, 40 to 70, in 5 fascicles inserted on the corolla-tube; filaments slender, gradually increasing in length from the inside outwards, the outer ones a little longer than the petals; anthers rounded, short. *Ovary* depressed, disk glabrous; cells 3; style thick, .1 to .2 in. long, stigma 3-lobed; ovules several in each cell. *Fruit* a globose or ampulliform drupe, faintly ribbed, .15 to .2 in. long, surmounted by the persistent calyx with enlarged connivent teeth; exocarp thin; endocarp very hard, bony, about 12-14-ribbed, globose below, cylindric and very short above. *Seed* 1, testa thin, albumen rather scanty; embryo curved, .1 to .15 in. long. Wall. Cat. 4412; A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Clarke in Hook. f. Fl. Br. Ind. III. 574 (*var. exc.*); Koord. & Val. Bijdr. VII. 141; Brand Monog. Sympl. 40. *S. mollis*, Wall. Cat. 4433; G. Don Gen. Syst. IV. 3. *S. Verhuelii*, Jungh. & de Vriese Pl. Nov. Ind. Or. 12; Miq. l.c. 467. *S. javanica*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 239 (*syn. S. rubiginosa exc.*) and For. Fl. II. 145. *S. lachnobotrya*, and *S. Horsfieldiana*, Miq. Fl. Ind. Bat. Suppl. 475. *Dicalyx javanicus*, Blume Bijdr. 1117.

PENANG: *Wallich* 4433; *Phillips*; *Curtis* 206; *King's Collector*

1353. PERAK: *Wray* 3387; *Scortechini* 900; *King's Collector* 925, 4376, 4395, 4683, 5235, 6219, 7091, 8646, 11019. PAHANG: *Ridley* in Trans. Linn. Soc. Ser. 2, III. 318. MALACCA: *Maingay* (K.D.) 956.—  
DISTRIB. Assam, Burma, Java (*Forbes* 682, 798, 861, 1203), Sumatra (*Forbes* 2614, 2691, 3150; *Beccari* 842), the Moluccas, the Philippines, and S. China.

The leaves in this species are very variable; for instance, those of *King's Collector* Nos. 4395, 4683 have oblong-lanceolate leaves 6 to 8 in. long and about 2 in. broad, with more distant nerves, and are nearly glabrous beneath; but some of the leaves approach very nearly to those of other specimens, and we cannot therefore separate it as a variety. The marked elongation of the fruiting inflorescence is another source of difficulty in superficial identification.

9. *SYMPLOCOS RIDLEYI*, King & Gamble, n. sp. A medium-sized tree; branchlets glabrous, angled, striate; leaf-buds acuminate, glabrous. *Leaves* coriaceous; ovate or oblong, acuminate at apex, attenuate at base; glabrous on both surfaces, shining above, greenish-yellow when dry; margins entire or remotely and faintly denticulate, recurved; 3 to 4 in. long, 1 to 1.5 in. broad; midrib slender, raised above; main-nerves 8 to 9 pairs, raised on both surfaces, straight, meeting in a looped intra-marginal nerve; secondary nerves few; reticulations prominent, raised above; petiole .3 in. long, channelled above. *Inflorescence* of sessile or very short few-flowered axillary racemes, as long as the petiole; rachis silky-pubescent; bracts and bracteoles orbicular, ciliate, pubescent; pedicels none or very short. *Calyx-lobes* orbicular, thin, ciliate, .1 in. broad, concave; tube very short. *Corolla-tube* very short, lobes ovate, .12 to .15 in. long, 3-5-nerved, white. *Stamens* about 50, in bundles opposite the corolla-lobes; filaments slender, the outer ones a little longer than the corolla-lobes; anthers rounded. *Ovary* villous, 3-celled, ovules 2 in each cell; disk glabrous; style thick, .1 in. long, stigma capitate, lobed. *Fruit* not known.

SINGAPORE: *Ridley* 5684.

A species very closely allied to *S. phyllocalyx*, Clarke, of N. India and China, and to *S. japonica*, A. DC. of Japan.

10. *SYMPLOCOS CELASTRIFOLIA*, Griff. MS.; Clarke in Hook. f. Fl. Br. Ind. III. 575 (1882). A tree (?); branchlets smooth, slender, glabrous. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and bluntly acuminate at apex, cuneate at base; glabrous on both surfaces, greenish-brown above, yellowish beneath when dry; margins crenate, slightly recurved; 2.5 to 5 in. long, 1.5 to 2.25 in. broad; midrib slender, impressed above; main-nerves 6 to 8 pairs, irregular, not prominent, at first straight, then curving upwards and branching to meet

near the margin in an intramarginal network; reticulations obscure; petiole .2 to .3 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a few- and basally-branched pubescent panicle of long slender racemes, 2.5 to 3 in. long; racemes 12-16-flowered; pedicels .1 in. long; bracteoles 2, lanceolate, .05 in. long, ciliate, pubescent. *Calyx-tube* .05 in. long; lobes 5, oblong, obtuse, .075 in. long. *Corolla* white, sweet-scented; tube very short; lobes ovate-oblong, .2 in. long. *Stamens* in 5 bundles opposite the corolla-lobes, 40 to 70, the outermost the longest and equal to the corolla-lobes. *Ovary* depressed, disk glabrous; cells 3; style .125 in. long, stigma capitate. *Fruit* an ovoid-ellipsoid drupe, .25 in. long, smooth, tipped with the rim and erect teeth of the persistent calyx. *Seeds* 1 to 3, testa membranous; embryo slender, straight, .1 in. long. Brand Monog. Sympl. 48.

PENANG: *Curtis* 3459. MALACCA: *Griffith* (K.D.) 3651.—DISTRIB. Borneo (*Teysmann*, *Motley*, *Beccari* 2374, *Haviland* 509B, 1642, 3706).

11. *SYMPLOCOS ADENOPHYLLA*, Wall. Cat. 4427 (1829). A tree reaching 50 to 60 feet in height, stem 15 to 20 in. in diam.; branchlets dark brown, smooth, upper parts and innovations dark rusty-glandular-pubescent. *Leaves* chartaceo-coriaceous; narrowly lanceolate to elliptic-lanceolate and elliptic; obtusely long caudate-acuminate at apex, cuneate or attenuate at base; glabrous on both surfaces, shining or not, olive-brown or dark reddish-brown when dry; margins crenate or sub-entire, the crenatures with large glands, sometimes recurved; 3 to 5 in. long, .7 to 1.5 in. broad; midrib slender, impressed above; main-nerves 5 to 8 pairs, distant, arching upwards to join in a looped intramarginal nerve at about two-thirds of the distance to the margin; secondary nerves and reticulations obscure; petiole .3 to .5 in. long, often bent. *Inflorescence* a 3- and basally-branched axillary panicle of racemes, glandular-rusty-pubescent, 1 to 2 in. long, racemes about 12-flowered; bracts ovate-acute, caducous; pedicels .05 to .1 in. long; bracteoles minute, thin, obtuse. *Calyx-tube* glabrous or minutely pubescent, .05 in. long; its teeth very minute, triangular or rounded, rusty-pubescent. *Corolla* yellowish-white, tube short; lobes oblong, rounded, about .15 in. long, incurved at tip. *Stamens* 40 to 50, in 5 bundles opposite the corolla-lobes, outer ones as long as those lobes; filaments slender; anthers small, rounded. *Ovary* depressed, disk glabrous, cells 3; style slender, .1 in. long; stigma capitate. *Fruit* an oblong-cylindrical or ellipsoid drupe .3 to .35 in. long and half as broad, smooth, pale yellowish-brown, crowned with the minute, inconspicuous, much-incurved, persistent calyx-teeth; exocarp smooth, thin; endocarp bony, ribbed. *Seed* 1; embryo straight, pendulous. G. Don Gen. Syst. IV. 3; A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2, 466;



Clarke in Hook. f. Fl. Br. Ind. III. 575; Brand Monog. Sympl. 48; Stapf in Trans. Linn. Soc. 2nd Ser. IV. 204. *S. iteophylla*, Miq. Fl. Ind. Bat. Suppl. 476; Brand l.c. *S. bancana*, Miq. l.c.

KEDAH: *Ridley* 5583. PENANG: *Wallich* 4427A; *Maingay* (K.D.) 959; *Curtis* 402, 445. PERAK: *Wray* 1119, 3842, 3925, 4123; *Scortechini* 490; *King's Collector* 1269, 2606, 6873. SELANGOR: *Ridley* 7553, 8549. MALACCA: *Griffith* (K.D.) 3649. SINGAPORE: *Wallich* 4427B; *G. Thomson*; *Hullett* 828; *Walker* 255; *Ridley* 3635A, 3809.—DISTRIB. Sumatra (*Beccari* 147); Bangka (*Horsfield* 39); Borneo (*Beccari* 2115, *Lobb*, *Haviland* 1187).

A variable species as regards the leaves and the length of the inflorescence; the prominent glands on the margins of the leaves are a noticeable character.

12. *SYMPLOCOS PERAKENSIS*, King & Gamble, n. sp. A tree with spreading branches reaching 50 to 60 feet in height; stem 15 to 20 in. in diam; branchlets dark brown, very slender. *Leaves* chartaceous; elliptic, long caudate-acuminate at apex, cuneate at base; glabrous on both surfaces, green when dry; margins entire, recurved; 2 to 3.5 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves 6 to 7 pairs, the two lowest near the margin and produced upwards along it, the others curved upwards to meet in a looped intramarginal nerve, which is rather prominent; secondary nerves and reticulations obscure; petiole .2 in. long, channelled above. *Inflorescence* a sessile 3-branched panicle of racemes axillary to the upper leaves or on the branchlets below them, 1 to 2 in. long or less; panicle branches and racemes very slender, the latter about 8–10-flowered; rachis grey-pubescent; 1 bract and 2 bracteoles, ovate-acute, scarcely .05 in. long, persistent; pedicels about .05 in. long. *Calyx-tube* short; lobes 5, rounded, grey-pubescent, ciliate, .05 in. long, as long as tube. *Corolla-tube* short; lobes oblong, white, .125 in. long. *Stamens* about 40, in 5 bundles opposite the corolla-lobes; filaments slender, exsert; anthers rounded, minute. *Ovary* villous; cells 3; style rather thick, villous, .1 in. long, stigma small. *Fruit* a cylindrical glabrous drupe, .4 to .5 in. long, .25 in. in diam., the top rusty-hirsute and crowned by the persistent rusty-hirsute calyx-lobes, the calyx-rim .1 in. broad; exocarp fleshy, endocarp hard, bony. *Seeds* 3, testa rather thick, embryo straight.

PERAK: *Scortechini* 646; *Wray* 2593, 2944; *King's Collector* 4446, 4570, 4586, 7863, 10163, 10501, 10515, 10801, 10985. SELANGOR: *Ridley* 10223.

This species is very near to *S. adenophylla*, but the leaves are entire, much thinner and smaller, and not glandular, and the inflorescence is more compound, more slender, grey- and not rusty-pubescent, and has rounded calyx-lobes.

13. *SYMPLOCOS BRANDIANA*, King & Gamble, n. sp. A small tree reaching 15 to 25 feet in height; stem 4 to 6 in. in diam.; branchlets round, densely covered with soft ferruginous tomentum and long stiff hispid hairs; innovations densely ferruginous-silky-tomentose. *Leaves* membranous; ovate-oblong, long acuminate at apex, rounded or cordate at base; pilose on both surfaces, at length glabrescent above, paler beneath, olive-brown when dry; margin entire, recurved, thickly villous; 3 to 6 in. long, 1 to 2 in. broad; midrib slender, prominent beneath; main-nerves about 8 pairs, much curving upwards to join as a looped intra-marginal nerve, raised beneath; reticulations obscure; petiole scarcely .1 in. long. *Inflorescence* of axillary few-flowered racemes or panicles up to 1.5 in. long, lax-flowered; rachis slender, thickly ferruginous-villous, as are the bracts and calyx; bracts leaf-like, cuspidate-acuminate, .2 to .4 in. long; bracteoles 2, similar but smaller; pedicels .1 in. long; flowers white. *Calyx-tube* very short; lobes linear-lanceolate, .1 to .2 in. long. *Corolla-tube* very short; lobes elliptic-obtuse, glabrous, 3-nerved, .15 in. long. *Stamens* 60 to 70 or even more, in 5 bundles opposite the corolla-lobes; filaments slender; anthers small, rounded. *Ovary* and disk villous, style slender, stigma capitate. *Fruit* oblong-cylindrical, light blue, constricted above the middle, villous, .8 in. long, .3 in. broad; exocarp fleshy, endocarp crustaceous; cells 3, the lower one bearing 1 seed; albumen fleshy; embryo slightly curved.

PERAK: *Curtis* 2030; *Scortechini* 346, 349 on Maxwell's Hill, 3,000 feet; *Wray* 677 at Waterfall Hill, Larút; *King's Collector* 1887, in dense jungle on rocky creeks.

We have named this handsome species in honour of the author of the most recent monograph of the genus.

14. *SYMPLOCOS CONCOLOR*, Brand Monog. Sympl. 65 (1901). A tree, reaching 30 to 40 feet in height; branchlets dark brown, innovations tawny-pubescent. *Leaves* thinly coriaceous; oblong or oblong-obovate, abruptly acuminate at apex, the acumen mucronate, attenuate at base; glabrous on both surfaces, shining above; margins entire or obscurely dentate; 3 to 4 in. long, 1-1.5 in. broad; midrib slender, slightly raised above; main-nerves 6 to 7 pairs, rather obscure, arching upwards to anastomose near the margin; reticulations prominent; petiole about .1 in. long. *Inflorescence* of sessile or very shortly peduncled, 3-branched panicles up to .5 in. long, all golden-pubescent, about 10-12-flowered; bracts ovate-acute, small; bracteoles smaller, 2 to each pedicel; pedicels slender, about .1 in. long. *Calyx-tube* funnel-shaped, .05 in. long; lobes 5, rounded, short. *Corolla-tube* very short; lobes oblong, .1 in.

long. *Stamens* about 60, scarcely exsert. *Ovary* and disk silky-pubescent; style slender, stigma capitate, 3-4-lobed. *Fruit* an oblong glabrous drupe, .3 in. long, .15 to .2 in. broad, surmounted by the slightly depressed disk which is shortly overtopped by the calyx-lobes.

PENANG: on Penam Bukit at 2,000 feet, *Curtis* 1039.

15. *SYMPLOCOS CALYCODACTYLOS*, Brand Monog. Sympl. 63 (1901). A tree (?); branchlets villous with long tawny spreading bristles, innovations densely villous. *Leaves* membranous; oblong-lanceolate, long-acuminate at apex, rounded at base, sometimes almost cordate; both surfaces covered sparsely with tawny bristles, especially on and along the nerves beneath; margins distantly long glandular denticulate; 4 to 5.5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above; main-nerves about 8 pairs, curving slightly upwards at an angle of about 30° with the midrib to anastomose near the margin; reticulations prominent, primary ones transverse parallel; petiole stout, villous, .15 to .2 in. long. *Inflorescence* a slender, axillary, tawny-villous raceme, 2 to 3 in. long, with about 4 to 5 flowers; bracts lanceolate-acuminate, .25 in. long, caducous; pedicels .5 in., very slender, ending in a dense tuft of tawny bristles beneath the calyx. *Calyx-tube* short; lobes 5, linear oblong, densely tawny-bristly without, glabrous within, .25 in. long. *Corolla-tube* short; lobes 5, obovate, glabrous, as long as calyx-lobes or slightly longer. *Stamens* about 80, 5-adelphous, filaments flattened; anthers small, rounded. *Ovary* and disk villous; style slender, .1 in. long; stigma small, capitate. *Fruit* unknown.

PERAK: at Waterloo, 3,000 feet, *Curtis* 1330.

16. *SYMPLOCOS OPHIRENSIS*, Clarke in Hook. f. Fl. Br. Ind. III. 479 (1882). A bush (Wray), or more probably a small tree; branches terete, nearly black, glabrous; innovations appressed-tawny-pubescent; buds ovate-acuminate, silky, .1 in. long. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acute or rounded or sometimes emarginate at apex, cuneate or rounded at base; glabrous and usually shining above, sparsely pubescent beneath when young, afterwards glabrous, reddish-brown when dry; margins entire or very obscurely denticulate, recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib stout, impressed above; main-nerves 8 to 10 pairs, raised on both surfaces, straight at first, then curving upwards and joining in an intramarginal looped nerve; secondary nerves many, similar, reticulations prominent; petiole stout, .1 to .2 in. long. *Inflorescence* of very short racemes, from the axils of the upper leaves or from the new wood below them; racemes .3 to .4 in. long, silky-pubescent, 5-7-flowered; bracts and bracteoles very small, ovate, acute; pedicels 0 to .1 in. long. *Calyx-lobes* 5, silky-pubescent, ovate-acute, ciliate, .6 in. long; tube .1 in. long. *Corolla-tube* short; lobes

white, oblong-obtuse, .2 in. long, 5-nerved. *Stamens* in bundles of 6 to 12 each opposite the corolla-lobes, 30 to 60 in all; filaments slender, outer as long as petals; anthers rounded, very small. *Ovary* and disk nearly glabrous at top; style slender, .15 to .2 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* ovoid-cylindric, blueish-purple when ripe, .3 to .4 in. long, .2 in. broad, surmounted by calyx-rim with patent lobes, nearly as wide as the top of the fruit; exocarp crustaceous; endocarp very hard, bony, obscurely ribbed and irregularly indented. *Seed* 1, testa membranous, albumen fleshy, embryo straight. Brand Monog. Sympl. 58. *Symplocos* No. 42, Herb. Ind. Or. Hook. f. & Th.

PERAK: on Gunong Bubu, 5,000 feet, Wray 3919; *Scortechini*. MALACCA: on Mount Ophir, Griffith (K.D.) 3650; Ridley 10083; Derry 623; Lobb.

The specimens of Wray and Scortechini have the leaves rounded at both ends, but there seems no reason to keep them as a separate variety from the specimens from Mount Ophir which are acute at apex and cuneate at base.

17. SYMPLOCOS CURTISII, Oliv. in Hook. Icon. t. 1757 (1888). A shrub or small tree, reaching 10 to 15 feet in height; branchlets slender, pale brown, glabrous; leaf-buds small, acuminate, pubescent. *Leaves* chartaceous; elliptic, abruptly long acuminate at apex, cuneate at base; glabrous on both surfaces, pale greenish-brown when dry; margins obscurely denticulate, slightly recurved; 4 to 9 in. long, 1.5 to 3 in. broad; midrib slender, raised beneath, impressed above; main-nerves 5 to 7 pairs, the lowest pair very near the margin, the rest gradually more and more distant, all curving upwards to and along the margin, where they form an intramarginal looped nerve; secondary nerves very few or none; reticulations transverse, fairly prominent, rather distant; petiole .2 to .4 in. long, channelled above. *Inflorescence* of short (up to .4 in. long) racemes axillary to the upper leaves or on the young wood below them; racemes about 5-flowered; bract ovate-acute, .1 in. long, keeled, villous; bracteoles 2, similar but smaller; pedicels stout, about .05 in. long. *Calyx-tube* about .1 in. long; lobes 5, ovate, obtuse, as long as tube, all minutely pubescent without. *Corolla-tube* very short, lobes elliptic-oblong, .2 in. long, 5-nerved, white. *Stamens* many, 60 or more; filaments slender, longer than corolla-lobes; anthers rounded, minute; staminal bundles only noticeable in bud. *Ovary* villous, disk glabrous; style slender, .2 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* a cylindric oblong berry, bright blue when ripe, .5 to .8 in. long, somewhat constricted at about one-third distance from the top; the top surmounted by the calyx-rim and connivent teeth; exocarp



crustaceous, endocarp woody; cells 1 to 3. *Seed* usually 1, testa membranous, albumen fleshy, embryo straight. Brand Monog. Sympl. 69.

PENANG: *Curtis* 1099. PERAK: *Wray* 692, 2830; *Scortechini* 328, 646, 1423; *King's Collector* 2084, 2099, 2406, 8431.

18. *SYMPLOCOS CRASSIPES*, Clarke in Hook. f. Fl. Br. Ind. III. 580 (1882). A tree (?); branchlets stout, smooth, grey. *Leaves* stoutly chartaceous; large, elliptic-lanceolate, abruptly acuminate at apex, subcordate or obtusely rhomboid at base; glabrous on both surfaces; margins sub-entire, slightly recurved; 6 to 7 in. long, 2 to 3 in. broad; midrib prominent, thick; main-nerves 10 to 12 pairs, irregular and at irregular angles, usually only slightly curved upwards to meet in a looped intramarginal nerve .25 in. from margin; secondary nerves and few transverse reticulations prominent; petiole very stout, .15 to .2 in. long. *Racemes* axillary, 4-flowered; pedicels very small, .1 in. long at most; bracts ovate-acute, like the rachis and calyx densely ferruginous-pubescent. *Calyx-tube* very short; lobes ovate, .075 in. long. *Corolla-tube* short; lobes .1 to .15 in. long, oblong-obtuse. *Stamens* about 30, slightly exsert. *Ovary* 3-celled; disk fulvous-pilose. *Fruit* not known. Brand Monog. Sympl. 52.

MALACCA: on Mount Ophir, *Maingay* (K.D.) 960.

19. *SYMPLOCOS PENANGIANA*, King & Gamble, n. sp. A small tree (?); branchlets rounded, upper ones and innovations densely dark ferruginous-hirsute. *Leaves* chartaceous; lanceolate, long acuminate at apex, somewhat rounded at base; glabrous above, sparsely pilose beneath with long stiff ferruginous hairs especially on and along the nerves; greenish-brown when dry; margins distantly but sharply serrate in the middle part, entire on the acumination and near the base, revolute; 4 to 7 in. long, 1 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerves 4 to 6 pairs, irregularly distant, curving upwards and meeting about .2 in. from the margin in a looped intramarginal nerve; secondary nerves and transverse reticulations scanty but prominent; petiole short, .15 in. long, stout, hirsute. *Inflorescence* a sessile very short raceme or panicle of flowers on the young branches; bracts several, very small, densely rusty-hirsute. *Calyx-tube* short; lobes 5, oblong, obtuse, .125 in. long, glabrous within, densely rusty-hirsute without. *Corolla-tube* short; lobes 5, oblong, rounded, .2 in. long. *Stamens* about 30; filaments slender; anthers rounded. *Ovary* villous; style slender, pubescent, .15 in. long; stigma capitate. *Fruit* unknown.

PENANG: at West Hill, 2,500 feet, *Curtis* 325.

20. *SYMPLOCOS CERASIFOLIA*, Wall. Cat. 4434 (1829). A tree, reaching 60 feet and even 80 feet in height; stem with a diam. of 20 in.; branchlets glabrescent, smooth, somewhat angled, reddish-brown; leaf-

buds nearly globose, scales rounded, acuminate. *Leaves* coriaceous-chartaceous; oblong or elliptic-oblong, acuminate at apex, cuneate or attenuate at base; glabrous above, sparsely pilose on the nerves beneath otherwise glabrous, dark greenish-brown when dry; margins crenately serrate except at the very base and on the acumination, slightly recurved; 5 to 7 in. long, 1 to 2 in. broad, midrib slender, impressed above; main-nerves 6 to 8 pairs, conspicuous, at once curving upwards and round to join each other in a well-marked looped ring .2 to .3 in. from the margin; reticulations transverse; petiole .5 to .7 in. long, slender, channelled above. *Inflorescence* of axillary and sub-terminal pubescent spikes; the rachis stout, angular; bracts broad, round, villous, early caducous; bracteoles 2, ovate-acute, .075 in. long, villous; flowers about 12 in each spike. *Calyx-tube* short, .05 in. long; lobes lanceolate, acute, pilose, .125 in. long. *Corolla-tube* short; lobes oblong-acute, 3-nerved, .2 in. long. *Stamens* about 30, or very numerous—over 100 (Scortechini), on the corolla-tube, fascicles not well separated; filaments very slender; anthers rounded, very minute. *Ovary* and disk slightly hairy; style slender, curved, .2 in. long, stigma capitate; cells 3, ovules 2 to 3 in each cell. *Fruit* a cylindric oblong drupe 1.5 to 2 in. long, 1 in. broad, truncate at both ends and tipped above by the persistent calyx-tube and lobes, the rim about .2 in. broad; smooth, yellowish-brown; exocarp thick, corky; endocarp woody with 7 to 8 sharp star-like ridges. *Seed* 1, testa membranous; albumen thin, embryo straight, pendulous; radicle long. A. DC. Prod. VIII. 257; Clarke in Hook. f. Fl. Br. Ind. III. 580; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Brand Monog. Sympl. 52. *Bobua cerasifolia*, Miers in Journ. Linn. Soc. XVII. 304.

PENANG: Wallich 4434; Curtis 1503, 3096. PERAK: Wray 445, 3003; Scortechini 515; King's Collector 6283, 6950. MALACCA: Maingay (K.D.) 962

Scortechini considered his No. 515 to represent a species separate from *S. cerasifolia*, but with a large series of specimens before us we find it difficult to agree to this.

21. SYMPLOCOS RIGIDA, Clarke in Hook. f. Fl. Br. Ind. III. 581 (not of Wall.) (1882). A tree with spreading branches, reaching 60 to 80 feet in height and 18 to 24 in. in diam. of stem; branchlets stout, dark brown, glabrous, angled when dry, marked with the prominent round raised scars of fallen leaves; branch-buds large, covered with oblong glandular-serrate stipular scales, softly silky on the back; leaf-buds acuminate, .3 to .5 in. long, silky-pubescent. *Leaves* coriaceous-chartaceous; oblong or oblong-lanceolate, acute or shortly acuminate at apex, attenuate at base; glabrous on both surfaces

and usually shining, dark greenish-brown when dry; margins entire or very shortly serrate, recurved when dry; 6 to 12 in. long, 2.5 to 5 in. broad; midrib stout, much raised beneath, impressed above; main-nerves 10 to 13 pairs, raised beneath, curving upwards to and along the margin; secondary nerves few or none; reticulations transverse, parallel, not prominent; petiole .7 to 1.3 in. long, stout, glabrous. *Inflorescence* of simple spikes, strobilate when young and scarcely .5 in. long, in flower 1.5 to 2 in. long with pubescent rachis, in fruit reaching 3 in. long with stout nearly glabrous rachis, in the axils of upper leaves or the young branchlets below them; bracts broadly ovate, acute, concave, minutely grey or tawny-pubescent; bracteoles 2, lanceolate-acute, .1 in. long, all early deciduous; buds ovoid, grey-pubescent. *Calyx-tube* .075 in. long; lobes 4, ovate-acute, blunt, .1 to .15 in. long, both grey-pubescent. *Corolla-tube* short, lobes 5, white, oblong, acute, .25 in. long, 5-nerved. *Stamens* in 5 bundles opposite the corolla-lobes, about 60; filaments very slender, outer ones longer than corolla-lobes; anthers rounded, minute. *Ovary* and disk glabrous; style curved, .25 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* ovoid-oblong, 1 to 1.5 in. long, .75 to 1 in. broad, waxy greenish-white when half ripe, dark blue when ripe; pale brown, shining, smooth, obscurely angled when dry; surmounted by the calyx-rim .15 in. broad with erect calyx-teeth; exocarp thick, fleshy; endocarp very hard, woody, with 8 sharp star-like ridges; cells 3. *Seeds* 1 to 3, testa thin fibrous, albumen fleshy, embryo straight, radicle long. Brand Monog. Sympl. 52. *Doxomma rigidum*, Miers in Trans. Linn. Soc. Ser. 2. Bot. I. 104. *Barringtonia rigida*, Clarke in Hook. f. Fl. Br. Ind. II. 510.

PERAK: Wray 1294, 3207; Scortechini 2046; King's Collector 4246, 4277, 4613, 5045, 5048, 6095, 6179, 7260, 7898, 8543, 10013. SELANGOR: Ridley 10544. MALACCA: Maingay (K.D.) 767, 965. SINGAPORE: Cantley 50; Ridley 1798, 5960.

22. *SYMPLOCOS RUBIGINOSA*, Wall. Cat. 4432 (1829). A large shrub or a tree sometimes reaching 70 to 100 feet in height and 15 to 20 in. or more in diam. of stem; branches stout, grey, nearly glabrous; branchlets stout, angled, glabrous or cinnamomeous- or ferruginous-hirsute; leaf-buds lanceolate, .3 to .4 in. long. *Leaves* coriaceous-chartaceous; obovate-oblong, acute or shortly and abruptly acuminate at apex, cuneate at base; glabrous above, pubescent especially on the nerves beneath, the pubescence pale rusty-brown, pale greenish-brown when dry; margins shortly dentate especially on the upper half, sometimes nearly entire, recurved; 5 to 11 in. long, 2 to 4 in. broad; midrib stout, prominent beneath, impressed above; main-

nerves 10 to 13 pairs, parallel, very prominently raised beneath and usually impressed above, curving upwards to and along the margin; secondary nerves few or none; reticulations many, prominent, transverse, parallel; petiole thick, densely pubescent, .5 to 1 in. long. *Inflorescence* of simple erect spikes, from the axils of upper leaves or from the young branchlets below them; spikes 1 to 2 in. long, softly cinnamomeous-pubescent, the rachis stout especially in fruit; flowers about 12 to 16 in each spike, each flower supported by a broad ovate rounded bract .175 in. long and two ovate-acute bracteoles .1 in. long. *Calyx-lobes* ovate-lanceolate, acute, .06 to .07 in. long; tube as long as lobes. *Corolla-tube* short, lobes white, oblong, .15 in. long, 3-nerved, glabrous. *Stamens* in 5 bundles opposite to the corolla-lobes, usually about 30; filaments unequal, the outer ones longer than the corolla-lobes; anthers minute, round. *Ovary* and disk glabrous, style slender, about .15 in. long, stigma capitate or lobed; cells 3. *Fruit* an ovoid-oblong drupe, .4 in. long, .25 in. broad, surmounted by the calyx-rim .1 in. in diam., pale brownish-yellow when dry, glabrous or softly pilose; exocarp thin, crustaceous, fragile; endocarp woody, faintly ridged; seeds usually 3. A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Clarke in Hook. f. Fl. Br. Ind. III. 580; Brand Monog. Sympl. 53. *Lodhra rubiginosa*, Miers in Journ. Linn. Soc. XVII. 299.

PENANG: Wallich 4432; Curtis 528, 1692; G. King. PERAK: *Scortechini* 1825; King's Collector 5192, 5771, 7112, 8105, 10015, 10021. MALACCA: Maingay (K.D.) 955; Griffith (K.D.) 3652. JOHORE: Ridley 11115. SINGAPORE: Cantley 72; Ridley 4117.—DISTRIB. Sumatra (Forbes 1991), Borneo (Beccari 1216, Haviland 1679, 3480).

#### Subgenus II.—CORDYLOBLASTE.

23. SYMPLOCOS CONFUSA, Brand Monog. Sympl. 88 (1901). A shrub, 5 to 8 feet high (Lobb); branchlets rough, dark brown, marked with prominent cushion-like scars, uppermost ones and innovations ferruginous-pubescent. *Leaves* chartaceous; variable in shape, elliptic-oblong to ovate-lanceolate bluntly acute at apex, attenuate often unequally at base; margins entire or slightly undulate, recurved; glabrous on both surfaces; 3 to 4 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves irregular, about 6 pairs; secondary nerves and reticulations also irregular, indistinct; petiole .2 to .3 in. long, slightly pubescent. *Inflorescence* of very short, 1-4-flowered, axillary, grey-silky racemes about .25 in. long; bracts very small, ovate-acute; bracteoles also minute, 2 to each pedicel; pedicels .05 to .1 in. long; flowers white, sweet-scented. *Calyx-tube*



campanulate, grey-silky, .1 in. long; lobes 5, short, rounded, ciliate. *Corolla-tube* funnel-shaped, .2 to .3 in. long, glabrous; lobes 5, oblong, obtuse, spreading, .15 in. long. *Stamens* very many (40 to 60), inside a staminal tube somewhat longer than the corolla-tube; filaments very short, slender; anthers small, rounded. *Ovary* and disk villous; style slender, hirsute or glabrescent, .3 to .5 in. long; stigma large, capitate. *Fruit* not known. *S. Henschelii*, Benth. & Hook. f. ex Clarke in Hook. f. Fl. Br. Ind. III. 588; Forbes & Hemsl. in Journ. Linn. Soc. XXVI. 73.

MALACCA: on Mount Ophir, Griffith (K.D.) 3644; Lobb; Maingay (K.D.) 954.—DISTRIB. Borneo (Beccari 2405), China.

This species, which in the Fl. Br. Ind. was placed under *S. Henschelii*, has been separated by Brand, who considers the true *S. Henschelii* (*Cordyloblaste Henschelii*, Moritzi in Bot. Zeit. vi. 604 (1848), to be a Java plant only. It is not thought necessary to maintain Clarke's var. *hirtistylis*.

24. SYMPLOCOS MAINGAYI, Benth. ex Clarke in Hook. f. Fl. Br. Ind. III. 588 (1882). A tree with spreading branches reaching 40 to 60 feet in height and 10 to 15 in. in diam. of stem; branches stout, light brown; branchlets and innovations densely ferruginous-velvety-pubescent. *Leaves* chartaceous; elliptic-oblong, shortly acuminate at apex, broadly attenuate or rounded at base; glabrous or with a few scattered hairs above, sparsely pubescent beneath except the nerves which are hirsute, marked also beneath by numerous faint transverse lines; margins entire; 4 to 6 in. long, 2 to 2.5 in. broad; midrib stout, very prominent beneath, impressed above; main-nerves 8 pairs, curving upwards and joining in a looped intramarginal nerve, impressed above; secondary nerves few and with the reticulations irregular; petiole .3 to .5 in. long, stout, densely ferruginous-pubescent. *Inflorescence* of stout densely ferruginous-pubescent racemes, 1 to 1.5 in. long, bearing about 8 to 10 flowers, in the axils of the upper leaves; bract 1, ovate, acute, .2 in. long; bracteoles 2, similar but smaller; pedicels stout, .1 to .15 in. long. *Calyx-tube* campanulate, densely rusty-pubescent; teeth 5, rounded, .05 in. long. *Corolla-tube* narrow funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without; lobes .5 in. long, oblong, reflexed. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it; top of tube truncate, 15–20-lobed, the lobes separable as ligules; stamens inserted irregularly on the tube and lobes, about 40 to 60; free part of filaments short, slender; anthers ovoid. *Ovary* and disk hairy; style slender, as long as corolla-tube, stigma capitate; cells 3. *Fruit* obovoid, obtuse, glabrous, 1.75 in. long, 1.25 in. broad, crowned

with the remains of the calyx-rim .125 in. wide, pericarp very thick, woody. Brand Monog. Sympl. 90.

PERAK: *King's Collector* 6728. MALACCA: *Maingay* (K.D.) 961.

25. SYMPLOCOS SCORTECHINII, King & Gamble, n. sp. A tree (?); branchlets pale brown, slender, scurfy; innovations sparsely grey-pubescent. *Leaves* chartaceous; oblong-lanceolate, attenuately blunt-acuminate at apex, cuneate at base; glabrous on both surfaces dark brown when dry, margins entire; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath, impressed above; main-nerves 8 to 10 pairs the lowest close to the margin, the others curved upwards to meet in a looped intramarginal nerve; secondary nerves many and, with the reticulations, irregular, fairly prominent; petiole .5 in. long, channelled above, slightly pubescent when young. *Inflorescence* of axillary or pseudo-terminal racemes, .7 to 1 in. long, sometimes giving the appearance of a terminal panicle; rachis grey-pubescent, angular; bract and 2 bracteoles lanceolate-acuminate, .1 to .15 in. long; pedicels .2 in. long. *Calyx-tube* campanulate, .2 in. long, grey-pubescent without, as are the rounded obtuse .05 in. long teeth. *Corolla-tube* slender, funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without; lobes .5 in. long, oblong-obtuse, much imbricate in bud. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it, top of tube truncate, about 15-lobed, the lobes separable as ligules; stamens inserted irregularly on the tube and lobes, about 40 to 50; free part of filaments short, slender; anthers rounded. *Ovary* and disk hairy; style slender, as long as corolla-tube, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* obovoid-oblong, obtuse, glabrous, 1.75 in. long, 1.2 in. broad, crowned with the remains of the calyx-rim .1 in. in diam.; pericarp thick, corky; seed 1.

PERAK: *Scortechini*.

This species comes very near to *S. Maingayi* in respect to its flowers and fruit, but the branches are much more slender, the dense ferruginous tomentum is absent, and the leaves are different, so we have no hesitation in describing it as a new species.

The following Bornean species seems worthy of description here: it may possibly be found also in the Peninsula:—

SYMPLOCOS HAVILANDI, King & Gamble, n. sp. A small tree (?); branchlets stout, somewhat flattened, yellowish-brown; leaf-buds conical, glabrous. *Leaves* coriaceous; elliptic, abruptly acuminate at apex, acute at base; glabrous on both surfaces, orange-brown when dry; margins entire, recurved; 3 to 4 in. long, 1.25 to 1.75 in. broad; midrib stout, impressed above; main-nerves 7 to 8 pairs, the lowest pair near the margin and more acutely angled (about 45°) than the others, straight at first at an angle of 60°, then curved to meet in a widely looped intramarginal nerve, prominently raised above when dry; secondary-nerves and reticulations also raised; petiole .4 to .5 in. long, stout, rough, the upper half winged by the decurrent margin of the blade. *Inflorescence* a nearly sessile, few-branched panicle of racemes, about 1.5 in. long;

flowers about 12; rachis glabrous, flattened; bracts and bracteoles minute, caducous; pedicels none or very short, scarcely .05 in. long; buds globose. *Calyx-tube* .05 in. long; lobes orbicular, ciliate, as long as tube. *Corolla-tube* very short; lobes 5, .15 in. long, ovate-oblong, ciliate. *Stamens* about 50, in 5 bundles of about 10 each, opposite the corolla-lobes; anther-cells orbicular; filaments slender, the longest as long as the petals. *Ovary* conical, glabrous; style slender, .1 in. long, stigma capitate. *Fruit* not known.

BORNEO: in Sarawak, near Kuching, *Haviland* No. 1954.

## 2. STYRAX, Linn.

Trees and shrubs, usually more or less lepidote or stellate-tomentose on all parts except the upper-surface of the leaves, rarely glabrous. *Leaves* various in shape, entire or serrulate. *Flowers* generally white, in lax axillary or terminal, simple or compound, often pendulous racemes; bracts very small. *Calyx* campanulate, free or slightly adnate to the base of the ovary, truncate or 5-toothed. *Corolla-tube* short; lobes 5, erecto-patent, elliptic-oblong, imbricate or valvate. *Stamens* 10, 1-seriate at the base of the corolla-tube; filaments more or less flattened, continuous with the connective; anthers large, linear, the cells parallel, erect. *Ovary* nearly free, at first 3-celled, later often 1-celled; style subulate; stigma capitate, somewhat 3-lobed; ovules few in each cell, in free ovaries nearly all erect from the lower basal angle, in half-adnate ovaries upper pendulous lower erect. *Fruit* globose or ellipsoid, seated on the cupuliform or patelliform calyx, breaking up irregularly. *Seeds* 1 or rarely 2 or more, integuments 2, the outer chartaceous or hardened, the inner membranous; albumen fleshy, copious; embryo straight, axile or excentric; cotyledons broad, with a longish terete radicle.—DISTRIB. Warmer regions of Asia and America, a few extending to temperate Asia and South Europe, species about 60.

Leaves green beneath, slightly stellate-pubescent .. .. 1. *S. serrulatum*.

Leaves white or greyish-white beneath, with occasional rusty-stellate hairs:—

Leaves small, under 5 in. long and 2.5 in. broad; calyx about one-third of the length of the corolla .. .. 2. *S. Benzoin*.

Leaves large, over 5 in. long and 2.5 in. broad; calyx about half of the length of the corolla .. .. 3. *S. crotonoides*.

1. *STYRAX SERRULATUM*, Roxb. Fl. Ind. II. 415 (1832). A shrub or small tree, reaching 50 feet in height; branches slender, branchlets stellately grey-pubescent. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or cordate, sometimes acute at base; nearly glabrous above, glabrescent beneath, but with stellate hairs on both sides of the nerves; margins sparingly and irregularly serrate, sometimes sub-

entire, slightly revolute; 1·5 to 5 in. long, 1 to 2 in. broad; midrib slender; main-nerves 6 to 8 pairs, curving upwards and anastomosing near the margin; secondary nerves and reticulations prominent, the latter transverse; petiole ·2 in. long, stellate-pubescent. *Racemes* terminal or from the axils of the uppermost leaves of the branchlets, 6-8-flowered or fewer, sometimes reduced to 1 only, sometimes paniculate from the absence of leaves, 1 to 2 in. long; rachis slender, densely white-stellate-pubescent; pedicels ·2 in. long; bracteoles linear, nearly as long as pedicels; flowers white. *Calyx* campanulate; tube white-pubescent without, glabrous within, ·15 in. long; teeth 5, ·05 in. long, irregular, repand-dentate, white-pubescent on both sides. *Corolla-tube* ·15 in. long, cylindric; lobes 5, ·25 in. long, oblong, sub-acute, densely white-pubescent without and within except the lower part of the tube. *Stamens* 10, 2·5 in. long; filaments inserted on the corolla-tube, wide and white-tomentose at the base, narrower and glabrous above, continued in the connective; anthers broadly linear, erect, as long as the filaments, rounded at top, cells 2 parallel. *Ovary* densely white-villous; style slender, ·3 in. long; stigma small, capitate; cells 3. *Fruit* ellipsoid, ·4 to ·5 in. long, ·3 in. broad, white- or grey-pubescent, supported by the patelliform calyx; pericarp fleshy, rather thin, irregularly breaking up. *Seeds* 1, rarely 2 or more; outer integument smooth, hard, shining, brittle; inner one membranous, brown; albumen firm, grey; embryo erect, nearly as long as the endosperm; cotyledons cordate, ·15 in. long; radicle thick, terete, as long as cotyledons. Wall. Cat. 4402; A. DC. Prod. VIII. 267; Hook. f. in Bot. Mag. t. 5950 (*syn. excl.*); Kurz in Journ. As. Soc. Beng. XLVI. ii. 237 and For. Fl. II. 142; Clarke in Hook. f. Fl. Br. Ind. III. 588; Prain Beng. Plants I. 656. *S. Porterianus*, Wall. Cat. 4401; A. DC. l.c.; Miq. Fl. Ind. Bat. I. Pt. 2, 463. *S. floribunda*, Griff. Notul. IV. 287.

PENANG: Wallich 4401; Phillips; Curtis 1187, 1538; Ridley 7176. PERAK: King's Collector 1662.—DISTRIB. India, at 3,000 to 7,000 feet from Nepal to Assam, Chittagong and Burma.

The plant is frequently affected by galls.

2. STYRAX BENZOIN, Dryand. in Phil. Trans. Vol. LXXVII. 308, t. 12 (1787). A tree with slender drooping branches, reaching 60 to 80 feet in height and 2 to 3 feet in diam. of stem; branches rounded, glabrous; upper branchlets rusty-grey-stellate-pubescent. *Leaves* chartaceous; elliptic, acuminate at apex, attenuate or rounded at base; glabrous above, densely grey-stellate-pubescent beneath; margins entire or rarely slightly denticulate; 4 to 5 in. long, 1·5 to 2·5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 6 to 8 pairs, curving



upwards to and along the margin; reticulations transverse, regular, prominent; petiole .3 to .5 in. long, channelled above, densely grey-stellate-pubescent. *Racemes* paniculate, terminal or axillary to the upper leaves, grey-stellate-pubescent; bracts ovate, caducous; pedicels slender, angular, .1 to .2 in. long; bracteoles linear, as long as the pedicels or nearly so; flowers silvery-white. *Calyx* cupular, .15 in. long, densely grey-stellate-pubescent without; teeth 5, minute. *Corolla-tube* .15 in. long, cylindric; lobes 5, .3 in. long, oblong-linear, acute, white-pubescent without and more or less within, recurved. *Stamens* 10, .3 in. long, attached to the tube of the corolla; filaments flattened, .15 in. long, white-pubescent, continued in the connective; anthers linear, slender, erect, acute at tip, as long as filaments, cells parallel. *Ovary* conical, villous above; style slender, .3 in. long; stigma small, capitate; cells 3, ovules 2 or more in each cell, placentas central. *Fruit* depressed-globose, variable in size, reaching .8 in. in diam. and .6 in. in height; white-pubescent, supported by the flattened persistent patelliform calyx; pericarp corky, rather thick, irregularly dehiscent. *Seed* usually 1, pale-brown with a broad basal hilum; outer integument hard, brittle, inner membranous; albumen firm; embryo horizontal or oblique, nearly as long as the endosperm; cotyledons flattened, oblong-cordate, .2 in. long; radicle smooth, .15 in. long, cylindric. *Blume* Bijdr. 671; *Roxb.* Fl. Ind. II. 416; *A. DC.* Prod. VIII. 260; *Bentl. & Trim.* Med. Pl. III. t. 169; *Miq.* Fl. Ind. Bat. I. Pt. 2, 463; *Clarke* in Hook. f. Fl. Br. Ind. III. 589; *Gürke* in Engl. & Prantl Pflanzenfam. IV. i. 178, fig. 93; *Koord. & Val.* Bijdr. VII. 132.

**PERAK:** *Wray* 808, 1208; *Scortechini* 1998; *King's Collector* 4459, 7840, 7884, 8615, 10208, 10305. **MALACCA:** *Maingay* (K.D.) 963, 964; *Griffith* (K.D.) 3668. **SINGAPORE:** *Ridley* 2650.—**DISTRIB.** Sumatra (*Beccari* 699; *Forbes* 3120A); Java (*Forbes* 1183).

This species gives the gum "Benzoin," or "Benjamin," of commerce. The plant is often affected by galls, causing curious tassel-like excrescences on the branches. The tree has the odour of violets (*Wray*).

3. *STYRAX CROTONOIDES*, *Clarke* in Hook. f. Fl. Br. Ind. III. 589 (1882). A tree, 60 to 80 feet high and 15 to 20 in. in diam. of stem; branches spreading and drooping; branchlets rather thick, grey, ultimate ones and innovations densely clothed with whitish-grey and rusty-stellate tomentum, the rusty hairs large and scattered among the rest. *Leaves* chartaceo-coriaceous; broadly oblong or elliptic-oblong, abruptly acuminate at apex, attenuate or cuneate at base; glabrous above except on the nerves, densely white-tomentose beneath, and with scattered rusty-stellate hairs; margins entire or undulate; 5 to 7 in. long, 2.5 to

4 in. broad; midrib prominent beneath, impressed and stellate-pilose above; main-nerves about 10 pairs, prominent, arched upwards to and along the margin; reticulations prominent, transverse; petiole .3 to .4 in. long, stellate-pubescent. *Racemes* in terminal and axillary panicles, 4 to 8 in. long, densely white-tomentose and rusty-stellate-pilose, including calyx; pedicels very short, 0 to .15 in. long; bracts oblong-lanceolate, glandular-dentate, .25 in. long; bracteoles 2, linear-subulate, .15 in. long; flowers creamy-white. *Calyx-tube* cupular, .2 to .25 in. long, truncate; teeth 5, very minute. *Corolla-tube* short, .15 long, glabrous at the very base, appressed white-pubescent above; lobes 5, valvate, .3 in. long, linear-oblong, acute, afterwards recurved. *Stamens* 10, about .3 in. long; filaments short, flat, glabrous, continued in the connective which is white-pubescent on the back; anthers .2 in. long, linear, mucronate, cells parallel. *Ovary* 5-lobed, white-villous, conical; style slender, as long as corolla; stigma capitate; cells 3, ovules 5 to 6, erect. *Fruit* ovoid, grey-pubescent, mucronate, .75 to 1 in. in diam., supported by the cupuliform calyx; pericarp thick, corky. *Seed* 1, outer integument pale brown, smooth, crustaceous, with a broad basal hilum, inner integument membranous; albumen firm, endosperm cushion-like; embryo somewhat oblique; cotyledons cordate, .2 in. long; radicle thick, terete, as long as cotyledons. *Crotoni affinis* sp. Wall. Cat. 7348.

PERAK: *Scortechini* 179; *King's Collector* 7775, 7967, 8558, 10734. SINGAPORE: *Wallich* 7848; *Cantley* 60.

This species, like the others, is also frequently found with large tassel-like insect galls in place of the inflorescence.

#### Order LXXIV. OLEACEÆ.

Erect or climbing shrubs or trees, unarmed. *Leaves* usually opposite, rarely alternate or verticillate, simple or pinnately 3-few-foliolate, entire or toothed; stipules none. *Inflorescence* sometimes dichotomously cymose and centrifugal, sometimes trichotomously paniculate, some or all branches centripetal; cymes or panicles axillary or terminal. *Flowers* hermaphrodite, often dimorphous, sometimes polygamous or dioecious, regular. *Calyx* free, usually small, campanulate, 4- or more-toothed or -lobed, rarely 0. *Corolla* gamopetalous; tube long or short; lobes or petals 4 to 12, imbricate or induplicate-valvate in bud. *Stamens* usually 2, sometimes 4, inserted on the corolla, or hypogynous if the petals are free or 0; filaments usually short; anthers rather large, ovate or oblong, rarely linear, dehiscing on the margin. *Ovary* free, 2-celled; style short or long; stigma simple or 2-lobed; ovules 1 to 2, rarely more, in each cell, attached to the inner angle near

the apex or base. *Fruit* capsular, loculicidally 2-valved or indehiscent, or a berry or drupe. *Seeds* solitary or 2 in each cell, erect or pendulous; testa thin or bony; albumen fleshy or horny or 0; embryo straight; radicle inferior or superior.—**DISTRIB.** Tropical and temperate regions of the world; genera about 18, species about 280.

Corolla-lobes imbricate :—

Seeds exalbuminous; usually climbing shrubs	..	..	1. JASMINUM.
Seeds albuminous; small trees..	..	..	2. OSMANTHUS.

Corolla-lobes valvate :—

Radicle superior; trees or erect shrubs :—

Corolla-tube very short, petals often in pairs	..	..	3. LINOCIERA.
Corolla tubular, sometimes absent	..	..	4. OLEA.
Radicle inferior; climbing shrubs	..	..	5. MYXOPYRUM.

*Nyctanthes Arbor-tristis*, Linn., is found in gardens in cultivation.

### 1. JASMINUM, Linn.

Erect or climbing shrubs. *Leaves* opposite or rarely alternate, simple trifoliate or imparipinnate, generally entire; petiole usually articulate. *Flowers* often handsome, white pink or yellow, often sweet-scented, in 2- or 3-chotomous or simple cymes or sometimes solitary, axillary or terminal, inflorescence centrifugal; bracts linear and small or ovate, sometimes petaloid, bracteoles usually linear. *Calyx-tube* usually funnel-shaped or campanulate; lobes 4 to 9, linear, long or short or 0. *Corolla-tube* narrow, more or less elongate; lobes 4 to 9, spreading, much imbricate. *Stamens* 2, usually included in the corolla-tube; filaments short; anthers oblong, attached to the filaments at the back near the base, cells parallel, connective broad, usually produced in a mucronate point. *Ovary* 2-celled; ovules usually 2 in each cell, attached near the base; style filiform, long or short, often both in different flowers on the same plant; stigma oblong or capitate, generally bifid. *Berry* didymous or simple by suppression of one carpel; carpels globose, ellipsoid or elongate, pericarp usually of two layers, the outer (exocarp) membranous, the inner (endocarp) fleshy or fibrous. *Seeds* usually 1 in each carpel, sometimes 2, testa very thin; albumen none; cotyledons plano-convex; radicle inferior, very small, included within the cotyledons or slightly exsert.—**DISTRIB.** Tropical and warm temperate regions of Asia, Africa, and Australia, one species in Europe, many in cultivation: about 90 species in all.

Leaves simple :—

Leaves penninerved, basal pair of nerves not opposite nor produced to form an intramarginal nerve :—

Inflorescence terminal :—

Erect or straggling shrub	..	..	1. <i>J. Sambac</i> .
---------------------------	----	----	-----------------------

## Climbing shrubs :—

Calyx-lobes .2 in. long or longer ; leaves rather large :—

## Leaves chartaceous :—

Leaves and branchlets fulvous-pilose, main-nerves

10 to 12 pairs .. .. . 2. *J. Griffithii*.

Leaves and branchlets glabrous, main-nerves 6 to

8 pairs .. .. . 3. *J. Maingayi*.

## Leaves membranous :—

Calyx-lobes spreading, .25 in. long or longer ; fruit-

ing pedicels thickened .. .. . 4. *J. Wrayi*.Calyx-lobes erect, .5 in. long ; pedicels very short 5. *J. Curtisii*.

Calyx-lobes under .2 in. long, pubescent ; leaves small :—

Corolla-tube short, .25 in. long .. .. . 6. *J. decussatum*.Corolla-tube .6 to .8 in. long .. .. . 7. *J. bifarium*.Inflorescence axillary .. .. . 8. *J. adenophyllum*.

Leaves penninerved, basal pair of nerves opposite, produced to form an intramarginal nerve :—

## Basal pair of nerves prominent, branchlets round :—

Flowers in few-flowered long-peduncled cymes ; pedicels

1 to 1.5 in. long .. .. . 9. *J. longipetalum*.

Flowers in many-flowered short-peduncled cymes ; pedi-

cels under .5 in. long .. .. . 10. *J. smilacifolium*.Basal pair of nerves not prominent, branchlets 4-angular .. 11. *J. insigne*.Leaves 3-foliate .. .. . 12. *J. Scortechinii*.

1. *JASMINUM SAMBAC*, Ait. Hort. Kew. I. 8 (1789). A sub-erect, straggling, scarcely climbing shrub ; branches terete, smooth ; branchlets slender, pubescent. *Leaves* membranous ; variable, usually ovate, often broadly so, acute or obtuse at apex, cuneate or rounded or cordate at base ; glabrous above, pubescent on the nerves beneath, often with tufts of hair in the axils of the main-nerves ; margins recurved ; 1.5 to 4.5 in. long, 1 to 2.5 in. broad ; midrib slender, impressed above, raised beneath ; main-nerves 4 to 6 pairs, arching upwards to and along the margin, raised beneath ; reticulations distinct on both sides ; petiole .1 to .25 in. long, pubescent, articulate in the middle. *Flowers* white, very fragrant, solitary or in 2-3-flowered terminal pubescent cymes ; bracteoles linear-subulate ; pedicels .25 in. long, pubescent. *Calyx*-tube campanulate, .1 in. long ; teeth 5 to 9, linear-subulate, .1 to .25 in. long. *Corolla*-tube slender, funnel-shaped, .5 in. long ; lobes 8 to 9, spreading, as long as tube, oblong acute or obtuse. *Stamens* included in the tube ; filaments short ; anthers oblong. *Ovary* rounded ; style slender ; stigmas 2, clavate. *Berry* didymous or with 1 carpel only by suppression ; carpels black, .25 in. in diam., sub-globose, surrounded by the sub-erect persistent calyx-teeth. Bot. Reg. t. 1 ; Bot. Mag. t. 1785 ; Wall. Cat. 2868 ; A.D.C. Prod. VIII. 301 ; Wight Ic. t. 704 ; Dalz. & Gibs. Bomb. Fl. 137 ; Brandis For. Fl. 311 ; Kurz in Journ. As. Soc.



Beng. XLVI. ii. 242, and For. Fl. II. 153; Clarke in Hook. f. Fl. Br. Ind. III. 591; Blume Bijdr. 677; Miq. Fl. Ind. Bat. II. 542; Cooke Bomb. Fl. II. 111; Prain Beng. Plants 659. *J. fragrans*, Salisb. Prod. 12. *J. undulatum*, Willd. Sp. Pl. I. 36 (not of Ker). *J. Zambac*, Roxb. Hort. Beng. 2, and Fl. Ind. Ed. Carey & Wall. I. 87. *J. quinqueflorum*, Heyne; Wall. Cat. 2878; A.DC. l.c. 302. *J. pubescens*, Wall. Cat. 2880, not of Willd. *Nyctanthes Sambac* and *undulatum*, Linn. Sp. Pl. 8. *Mogorium Sambac*, Lamk. Dict. IV. 210; Ill. t. 6, fig. 1. *M. undulatum*, Lamk. Dict. IV. 212. "Kudda-mulla," Rheede Hort. Mal. VI. tt. 50, 51. Burm. Thes. Zeyl. t. 58, fig. 2.

PERAK: *Scortechini* 997.—DISTRIB. India, Ceylon, Burma, Siam.

Much cultivated in India and in all tropical regions. The cultivated forms have many-flowered cymes and rounded corolla-lobes, and they are often found with double flowers.

2. *JASMINUM GRIFFITHII*, Clarke in Hook. f. Fl. Br. Ind. III. 593 (1882). A slender climbing shrub; branchlets densely and patently fulvous-villous. *Leaves* chartaceous; ovate- or elliptic-oblong, bluntly acute or acuminate at apex, rounded or cordate at base; fulvous-pilose on both surfaces, sparsely above, more densely beneath but glabrescent when old, the uppermost often whitened; 4 to 6 in. long, 1.5 to 3.5 in. broad; midrib prominent beneath; main-nerves 10 to 12 pairs, at first straight then arching upwards to join in a prominent looped intramarginal nerve; secondary nerves few; reticulations rather indistinct; midrib and all nerves impressed above and pilose, raised and densely fulvous-villous beneath, tufted in the axils; petiole stout, .2 to .4 in. long. *Flowers* creamy-white, in terminal, many-flowered, fulvous-pilose cymes, 1 to 1.5 in. long and up to 2 in. broad; bracts leafy, lanceolate, about .5 to 1 in. long, few; bracteoles many, linear, similar to calyx-lobes, of various lengths. *Calyx-tube* slender, .1 in. long; lobes 5, linear, .2 in. long. *Corolla-tube* slender, slightly enlarged above, .75 in. long; lobes 5, spreading, .25 in. long, elliptic, apiculate; lobes and tube minutely pubescent without. *Stamens* included or slightly exsert; filaments broad; anthers oblong-lanceolate with a broad connective, .15 to .2 in. long. *Ovary* glabrous; style slender; stigma clavate. *Berry* didymous; carpels waxy-white, globose, .3 to .4 in. in diam., pericarp crustaceous, glabrous. *Seed* usually one, testa fibrous; cotyledons thick, plano-convex, .2 in. in diam.

PERAK: *King's Collector* 10229. MALACCA: *Griffith* (K.D.) 3704. SINGAPORE: *Ridley* 8455.

VAR. *cuspidata*, King & Gamble. *Leaves* thinner than in the type, oblong, abruptly and sharply cuspidate-acuminate at apex, attenuate and

abruptly rounded at base, 5 to 5·5 in. long, 1·5 to 2 in. broad, much less pilose, main-nerves 8 to 10 pairs; seeds 1 to 2, testa crustaceous.

PENANG: *Curtis* 2787. MALACCA: *Maingay* (K.D.) 998. JOHORE: at Gunong Palai, 1,400 feet, *G. King*.

3. *JASMINUM MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 594 (1882). A climbing shrub; branchlets light brown, terete, internodes somewhat elongate, innovations and inflorescence tawny-pubescent. *Leaves* chartaceous; ovate or ovate-oblong, acuminate and often mucronate at apex, rounded or attenuate or cuneate at base; glabrous on both surfaces; margins recurved; 3 to 6 in. long, 2 to 2·5 in. broad; midrib stout; main-nerves 6 to 8 pairs, arching upwards to join in a looped intramarginal nerve about .2 in. from the margin; secondary nerves few; reticulations distant, obscure; all nerves strongly impressed above and raised beneath; petiole .5 to .7 in. long, articulate in the middle, twisted, the bases of each pair connected by a raised nodal line. *Flowers* in terminal or axillary, paniculate, tawny-pubescent, trichotomous cymes, 1·5 to 2 in. long, sessile or peduncled; bracts oblong or spatulate, leafy; bracteoles linear, about .25 in. long or less; pedicels blueish, .15 in. long; flowers white, sometimes slightly tinged with pink. *Calyx-tube* campanulate, .07 to .1 in. long; teeth 6, linear-subulate, .325 in. long. *Corolla-tube* slender, .5 to .7 in. long, glabrous; lobes 8 to 10, spreading, rotate, oblong-lanceolate, apiculate, .4 in. long, with prominent nerves. *Stamens* included in the corolla-tube; filaments slender, appressed to the tube; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindrical, glabrous; style slender, .4 to .5 in. long; stigma clavate. *Fruit* of one carpel, oblong, .5 in. long, .3 in. broad, exocarp thin shining, endocarp fibrous. *Seeds* 2, testa thin. Hook. f. Bot. Mag. t. 7823.

PENANG: *Maingay* (K.D.) 1000; *Curtis* 643. PERAK: *Scortechini* 139, 304; *Curtis* 2032; *King's Collector* 2761, 2762, 3975.—DISTRIB. Borneo (*Haviland & Hose* 911).

VAR. *kedahensis*, King & Gamble. *Branchlets* and inflorescence thickly rusty-pubescent. *Leaves* more ovate, rounded at base, nerves fewer, rarely 3 to 4 pairs, the two lower pairs very strong. *Drupe* nearly globose.

KEDAH: *Ridley* 5535.

A well-marked variety which may prove, when better known, to be a species.

4. *JASMINUM WRAYI*, King & Gamble, n. sp. A slender climbing shrub; branchlets pale brown, slender, terete. *Leaves* membranous; oblong or obovate-oblong, acuminate at apex, attenuate or rounded, sometimes slightly auricled at base; glabrous on both surfaces except

for tufts of tawny hairs in the axils of the main-nerves beneath; 3 to 7 in. long, 1·5 to 2·5 in. broad; midrib very slender, raised beneath; main-nerves about 7 pairs, curving upwards to and along the margin where they are obscurely connected in an intramarginal looped nerve, usually slightly impressed above and raised beneath; secondary nerves and reticulations obscure; petiole ·3 to ·5 in., slender, twisted. *Flowers* cream-coloured, in terminal, about 15–20-flowered corymbose cymes 2 to 3 in. long; peduncle 1 to 1·5 in. long, branches at right angles to rachis in fruit, ·7 to 1 in. long; bracts lanceolate-acuminate, ·5 in. long; bracteoles linear-subulate, ·2 to ·3 in. long; pedicels slender in flower, clavately-thickened in fruit and then ·3 to ·5 in. long. *Calyx-tube* very short; lobes 5, linear-subulate, spreading, curved, ·25 in. long, glabrous or slightly pilose. *Corolla-tube* slender, ·75 in. long, slightly enlarged above; lobes 8 to 9, narrow, ·3 to ·4 in. long. *Stamens* included in the corolla-tube; filaments short; anthers oblong, long-mucronate. *Ovary* cylindric, depressed; style slender; stigma slightly clavate. *Fruit* didymous; carpels ovoid-globose, greenish-white, ·25 to ·5 in. long, exocarp thin shining, endocarp fibrous. *Seed* 1, testa very thin, membranous; cotyledons plano-convex, thick.

PERAK: *Wray* 2297, 2905, 3147; *King's Collector* 1838, 2484.

VAR. *hispid*a, King & Gamble. Upper branchlets and inflorescence including calyx sparsely hispid, also midrib and main-nerves of leaves beneath; under-surface of leaves often pubescent; main-nerves up to 10 pairs.

PERAK: *King's Collector* 5893, on limestone hills. SELANGOR: *Curtis* 3774.

VAR. *axillaris*, King & Gamble. *Leaves* rather small, sparsely pubescent, especially on the midrib and main-nerves; inflorescence axillary, few-flowered (5 to 7), calyx hispid; fruit large, up to ·5 in. in diam.

PERAK: on Maxwell's Hill, 3,000 feet—a slender climber, *Scortechini* 273.

5. JASMINUM CURTISII, King & Gamble, n. sp. A climbing shrub (?); branchlets slender, terete, minutely rusty-pubescent. *Leaves* membranous; ovate or ovate-oblong, acuminate at apex, rounded at base; glabrous on both surfaces except for pubescence on the nerves above and tufts of hair in the axils of the main-nerves beneath; 3 to 5 in. long, 1 to 2 in. broad; midrib slender; main-nerves 5 to 6 pairs, distant, curving upwards and joining in a looped nerve ·1 to ·2 in. from the margin, raised and prominent on both surfaces; secondary nerves and reticulations few, irregular; petiole ·4 in. long, pubescent, twisted, articulate in the middle, the bases of each pair connected by a faint

nodal line. *Flowers* in a terminal trichotomous rusty-pubescent cyme, supported by pale (white?) leafy, ovate-lanceolate, pubescent bracts 1 to 1.25 in. long; bracteoles similar but smaller; pedicels .15 in. long; flowers in each cyme about 15 to 20. *Calyx-tube* campanulate, .15 in. long; lobes 6, linear-subulate, .5 in. long. *Corolla-tube* slender, cylindrical, 1 in. long; lobes 8 to 9, spreading or recurved, .5 in. long, oblong-lanceolate, acute. *Anthers* oblong, .125 in. long, mucronate. *Ovary* cylindric, glabrous; style slender; stigmas 2, clavate. *Fruit* not known.

PERAK: at Ipoh, *Curtis*.

A remarkable species, distinguished by the very long hair-like calyx-lobes and the coloured or white large leafy bracts and bracteoles.

6. *JASMINUM DECUSSATUM*, Wall. Cat. 2860 (1829). A climbing shrub; branchlets slender, densely rusty-pubescent. *Leaves* chartaceous; ovate or ovate-lanceolate, acuminate at apex, rounded at base; sparsely pubescent above, more densely so beneath; 2 to 4 in. long, 1 to 1.5 in. broad; midrib rather stout; main-nerves 4 to 5, lowest pair obscure, rest curved upwards to meet near the margin, impressed above, raised beneath; petiole .3 to .4 in. long, pubescent, articulate near the base, the bases of each pair of petioles (as also branchlets) joined by a raised nodal line on either side. *Flowers* in densely pubescent axillary and terminal trichotomous corymbose cymes about 1 to 2 in. long, supported by a pair of large leaf-like bracts; bracteoles linear-subulate; pedicels .1 to .2 in. long. *Calyx-tube* short; teeth 6, subulate, .1 in. long. *Corolla-tube* slender, .25 in. long; lobes 8 to 9, as long as tube, oblong-lanceolate, apiculate. *Stamens* included in the corolla-tube; filaments short; anthers oblong, .1 in. long, mucronate. *Ovary* rounded, glabrous; style slender, longer than the corolla-tube (in short-stamened flowers); stigmas two, clavate. *Fruit* of one ellipsoid carpel, .2 to .3 in. long, glabrous. A.D.C. Prod. VIII. 306; Kurz in Journ. As. Soc. XLVI. ii. 241, and For. Fl. II. 151; Clarke in Hook. f. Fl. Br. Ind. III. 596.

PENANG: *King's Collector* 1425, at Trang, 100 to 300 feet.—DISTRIB. Burma (*Wallich* 2860, *Griffith* 3699).

7. *JASMINUM BIFARIUM*, Wall. Cat. 2866 (1829). A climbing shrub; branchlets slender, terete, brown when dry, pubescent or nearly glabrous. *Leaves* chartaceous, usually bifarious; ovate or ovate-oblong, acuminate at apex, rounded or truncate sometimes almost cordate at base; pubescent or sometimes nearly glabrous on both surfaces; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, pubescent, impressed above, raised beneath; main-nerves 4 to 6 pairs, pubescent, prominent beneath, arched upwards to join in an intramarginal nerve; secondary nerves and reticulations very obscure; petiole .2 to .3 in. long, twisted, articu-



late in the middle, the bases of each pair connected (as are the branchlets) on either side by a raised nodal line. *Flowers* white, in few- (4-12-) flowered, pubescent, sub-capitate cymes, sub-sessile in the axils of the two uppermost bract-like leaves; bracteoles linear-subulate, .15 in. long; pedicels .1 in. long. *Calyx-tube* campanulate; teeth 5 to 7, linear-subulate, .1 to .15 in. long. *Corolla-tube* slender, cylindric, .6 to .8 in. long; lobes 6 to 9, ovate-oblong, spreading, apiculate, .2 to .3 in. long. *Stamens* included in the corolla-tube; filaments short, slender; anthers oblong, mucronate, .1 to .15 in. long, connective broad. *Ovary* cylindric, glabrous; style slender, exsert; stigmas 2, clavate. *Fruit* a didymous berry; carpels ovoid, .5 in. long, .2 in. broad; exocarp membranous shining, endocarp fibrous. *Seed* conform to carpel, testa very thin, membranous. A.D.C. Prod. VIII. 305; Clarke in Hook. f. Fl. Br. Ind. III. 595. *J. bracteatum*, Wall. Cat. 2867. *J. nummularoides*, Blume Mus. Lugd. Bat. I. 275; Miq. Fl. Ind. Bat. II. 537.

PENANG: Wallich 2866, 2867; Curtis 1920; Ridley 9361. PERAK: Wray 4180; King's Collector 860, 4920, 10699; Deschamps; Scortechini 59, 144, 238. SELANGOR: Ridley 7550, 8567. PAHANG: Ridley in Trans. Linn. Soc., Ser. 2, III. 319.—DISTRIB. Java.

VAR. *glabra*, Clarke in Hook. f. Fl. Br. Ind. III. 595. *Leaves* larger, elliptic, rhomboid or rounded at the base, more glabrous, less bifarious; calyx-teeth rather longer. *J. Lessertianum*, A.D.C. Prod. VIII. 304.

JUNKSEYLO (Tongka): Curtis 2911. PENANG: Maingay (K.D.) 999; Deschamps. PERAK: Wray 4180; Scortechini; Kunstler 122. MALACCA: Griffith (K.D.) 3708; Goodenough 1995. JOHORE: Ridley 4217. SINGAPORE: Lobb; Ridley 10760.—DISTRIB. Sumatra.

8. *JASMINUM ADENOPHYLLUM*, Wall. Cat. 2876 (1829). A very slender wiry climber; branchlets extensively twining, glabrous. *Leaves* membranous; ovate-lanceolate to elliptic-oblong, variable, acuminate and mucronate at apex, cuneate at base; glabrous above except on the midrib, glabrous beneath except the tuft of tawny hairs in the axils of the main-nerves; margins somewhat undulate; 1.5 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves very slender, obscure, about 6 pairs, curving upwards to meet in a faint intramarginal looped nerve; petiole slender, twisted, articulate in the middle, .2 to .3 in. long, hispid. *Flowers* white, solitary, or 2 to 3 together in a slender, sometimes leafy, umbel from the axils of the leaves; peduncle .75 to 1.25 in. long, flattened above and with a pair of opposite bracts near the middle; bracts of umbel 2, linear-subulate, .3 in. long; pedicels very slender, .75 to 1 in. long, clavately enlarged in fruit. *Calyx-tube* campanulate, glabrous, ribbed, .1 in. long; lobes linear-subulate, keeled on the back,

sparsely hispid, .4 to .5 in. long, points recurved. *Corolla-tube* slender, funnel-shaped, .75 in. long; lobes as long or slightly longer, 8 to 9, recurved, oblong-ligulate, about .25 to .3 in. broad. *Stamens* included in the corolla-tube; filaments short, slender; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindric; style slender; stigma clavate. *Fruit* globose, shining, young carpels .25 in. in diam. A.D.C. Prod. VIII. 314; Clarke in Hook. f. Fl. Br. Ind. III. 597.

PENANG: *King's Collector* 1736.—DISTRIB. Khasia Hills (*Wallich*).

This species is clearly quite a small climber, and while the Penang specimens have only small leaves those from the Khasia Hills show comparatively large ones, but this is not unnatural, and we believe the identification to be correct.

9. *JASMINUM LONGIPETALUM*, King & Gamble, n. sp. A large climbing shrub, reaching 30 to 40 feet; branchlets slender, terete, pale brown. *Leaves* chartaceo-coriaceous, 3-nerved; elliptic, acute or shortly acuminate at apex, attenuate or cuneate or slightly rounded at base; glabrous on both surfaces; margins slightly recurved; 2 to 6 in. long, 1.5 to 3 in. broad; midrib slightly impressed above, shortly raised beneath; main-nerves 7 to 8 pairs, the basal pair opposite, at about 25° with the midrib produced in an intramarginal nerve about .25 in. from the margin, looped where the others, which are at about 65° with the midrib, join it; secondary nerves and reticulations very indistinct; petiole .2 to .4 in. long, twisted. *Flowers* white tinged with pink, fascicled 3 to 6 together in the axils of the upper leaves, forming sessile umbellate cymes; bracts very small, ovate-acute, deciduous; pedicels 1 to 1.5 in. long, very slender, summit enlarged in fruit. *Calyx-tube* short; lobes 6, glabrous, linear-subulate, .1 in. long, margins inflexed. *Corolla-tube* very slender, .75 in. long; lobes 9, linear-oblong, acute, 3-5-nerved, .75 to 1 in. long, much recurved in flower. *Stamens* within the tube; filaments short, slender; anthers oblong, .175 in. long, obtuse. *Ovary* glabrous, 2-celled; style slender; stigma flattened, minutely pubescent. *Fruit* didymous; carpel usually 1 only by suppression, black, globose, .4 to .5 in. in diam.; pericarp fleshy, glabrous. *Seeds* 2, testa very thin, cotyledons plano-convex.

PERAK: *King's Collector* 2765, 6005—on rich soil at 300 to 800 feet elevation, scarce. SINGAPORE: *Ridley* 10937.

A particularly handsome and well-defined species, which is well worthy of garden cultivation.

10. *JASMINUM SMILACIFOLIUM*, Griff. MS., Clarke in Hook. f. Fl. Br. Ind. III. 600 (1892). A large glabrous climbing shrub; branchlets pale brown, terete. *Leaves* coriaceous, 3-nerved; ovate, abruptly caudate-

acuminate at apex, obtuse or nearly cordate at base; margins entire, recurved; 5 to 7 in. long, 3 to 4 in. broad; midrib very prominent, impressed above, much raised beneath; two lowest main-nerves very prominent, similar to the midrib, curved upwards to form a pair of intramarginal nerves meeting at the apex; remaining main-nerves irregular, 3 to 4 pairs, inconspicuous; secondary nerves and reticulations raised above; petiole .75 in. long, twisted, articulate in the middle. *Inflorescence* of axillary 5-20-flowered cymes; rachis jointed, terete; bracts spatulate, .1 to .2 in. long; bracteoles smaller, linear; pedicels .2 to .3 in. long, greatly enlarged in fruit; flowers white, tinged with pink. *Calyx* campanulate, tube .15 in. long; teeth 5, .05 in. long. *Corolla-tube* slender, cylindrical, .75 to 1 in. long; lobes oblong, acute or apiculate, .75 in. long, .2 in. broad. *Stamens* inserted in the throat of the tube; filaments short; anthers linear-oblong, .25 in. long, mucronate. *Drupe* didymous; carpels ellipsoid, .1 in. long, .3 to .4 in. broad, smooth, shining.

MALACCA: *Griffith* (K.D.) 3698; *Maingay* (K.D.) 997.

11. JASMINUM INSIGNE, Blume Mus. Bot. Lugd. Bat. I. 278 (1849).

An extensively climbing shrub; branches obscurely quadrangular with pale-grey corky bark; branchlets acutely quadrangular, glabrous, the edges pale-corky-winged. *Leaves* chartaceo-coriaceous; opposite, occasionally whorled; elliptic or elliptic-oblong, acute at apex, cuneate at base; glabrous on both surfaces; margins recurved; 2 to 8 in. long, 1 to 4 in. broad; midrib slender, raised beneath; main-nerves 6 to 7 pairs, the basal pair faint, opposite, at about 30° with the midrib, produced in an intramarginal nerve .1 to .2 in. from the margin, looped where the others, which are at 50° to the midrib, join it; secondary nerves and reticulations obscure; petiole .4 to 1.2 in. long, twisted, the upper part bordered for a short distance by the decurrent margins of the blade. *Flowers* white, in compact, many-flowered, glabrous cymes from the axils of the leaves or (more usually) from the stem; bracteoles subulate, .1 to .15 in. long, caducous; pedicels stout, .2 in. long, somewhat angular. *Calyx-tube* campanulate, .25 in. long; lobes 4 to 5, linear-subulate, unequal, .25 to .35 in. long, points hooked. *Corolla-tube* slender, .75 to 1 in. long, somewhat inflated above; mouth slightly thickened; lobes 4 to 5, spreading, ovate-oblong, apiculate, .5 in. long, .3 to .4 in. broad. *Stamens* in the tube of the corolla; filaments flattened; anthers oblong, mucronate, .25 to .3 in. long. *Ovary* glabrous, rounded; style slender, clavate, obscurely cleft in 2 short stigmas; cells 2. *Fruit* didymous; carpels oblong, smooth, white when ripe. Miq. Fl. Ind. Bat. II. 541. *J. cauliflorum*, Scortechini MS. in Herb. Calcutta.

PERAK: at Theripay Taipay, *Scortechini*; Wray 2840; Cantley 23; King's Collector 2890, 3398, 7059.—DISTRIB. Sumatra, *Forbes* 2906.

A very fine species of well-marked characters.

12. *JASMINUM SCORTECHINII*, King & Gamble, n. sp. A slender climbing shrub, reaching 60 feet in length; branchlets dark-coloured, glabrous. *Leaves* thin when young, almost coriaceous when old, 3-sometimes 1-foliolate, opposite or sub-opposite; terminal leaflet ovate or lanceolate, acuminate at apex, rounded at base; glabrous on both surfaces, upper surface shining, nearly black when dry, lower surface dull, reddish when dry; 2.5 to 4 in. long, 1 to 1.5 in. broad; lateral leaflets similar but slightly smaller and often lanceolate; midrib slender, raised beneath; main-nerves very indistinct, apparently 6 to 8 pairs; petiole .75 in. long, petiolule of end leaflet .5, of side leaflets .3 in. long, all grooved, slender, articulate below the leaflet. *Flowers* white, in axillary or terminal trichotomous cymes, terminal ones often paniculate; peduncles .5 to 1 in. long; bracts ovate-acute or subulate, .1 in. long; cymes sparsely scaly; bracteoles at the base of the calyx minute; pedicels .1 to .2 in. long, very much enlarged in fruit and then reaching .5 to .7 in. in length and .3 in. in diam. at top. *Calyx-tube* campanulate, .125 in. long; teeth 5, very short, triangular. *Corolla-tube* slender, enlarged above, .4 to .6 in. long; lobes 5, ovate-cordate, obtuse, .3 to .4 in. long, spreading. *Stamens* included in the corolla-tube; filaments short; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindrical, glabrous, 2-celled; style slender, as long as the corolla-tube; stigma clavate. *Fruit* didymous; carpels ellipsoid, .75 to 1 in. long, .5 in. broad; pericarp thin, crustaceous, blackish-brown. *Seed* nearly filling the cavity; testa thin, fragile; cotyledons oblong-obtuse, slightly auricled at base, .5 to .6 in. long by .25 in. broad, plano-convex.

PENANG: *Curtis* 1227, 2031. PERAK: *Scortechini* 383, 479; *Ridley* 10679; *King's Collector* 7006, 7009; *Curtis* 169.

The description is largely after *Scortechini* MS. The species comes very near *J. lanceolaria*, Roxb., but differs in its more slender habit, thinner leaves, and large ellipsoid carpels.

*Ridley's* No. 8325 from Lankawi Island, Kedah, is a twiggy, apparently erect shrub with trifoliolate leaves, the leaflets all obovate-orbicular emarginate, the end one reaching 1.7 in. long and 1.3 in. broad, the side ones only about .6 in. long and broad. The fruits are of one carpel about the size of a small pea, and the flowers are unknown. It may possibly not be a *Jasminum* (Herb. Kew).

The following species from Borneo is of interest, and may perhaps be found later on in the Peninsula:—

*JASMINUM SARAWACENSE*, King & Gamble, n. sp. A climbing shrub; branchlets pale brown, terete; internodes rather long. *Leaves* opposite, chartaceous; elliptic-



oblong, long-acuminate at apex, cuneate at base; both surfaces glabrous; margins recurved; 4 to 7 in. long, 1.75 to 2.75 in. broad; midrib strong, impressed above, raised beneath; main-nerves 4 pairs, the lowest pair near the margin at an angle of about 30° with the midrib, the remaining pairs at about 50°, curving upwards to meet in an intramarginal looped nerve, which is also met by secondary nerves above the fourth pair; reticulations irregular, not prominent; petiole .5 to .75 in. long, twisted in the middle. *Inflorescence* of axillary, long-peduncled, trichotomous, pubescent, corymbose cymes, about 1 in. broad at top, usually 1 pair from each node; peduncle terete, 2 to 3 in. long, sometimes branched, minutely pubescent; branches very short, .2 in. long; pedicels clavate, .1 to .15 in. long; bracts and bracteoles linear-subulate, .25 in. long, one pair of bracteoles to each terminal fascicle of 3 flowers; flowers white, buds clavate, 1 in. long. *Calyx-tube* campanulate, .15 in. long; lobes 6, linear-oblong, applicately infolded at the middle inwards, .15 to .2 in. long, pubescent. *Corolla-tube* cylindrical, 1 in. long; lobes 6, spreading, oblong, rounded at top, .4 to .5 in. long, prominently 3-5-nerved. *Stamens* 2, inserted at about the middle of the tube within; filaments short, decurrent within the tube; anthers linear-oblong, .2 in. long. *Ovary* cylindric, truncate and depressed at top, 2-celled; style very slender; stigma clavate. *Fruit* not known.

BORNEO: near Kuching in Sarawak, *Haviland & Hose* 3489.

## 2. OSMANTHUS, Lour.

Trees or shrubs, glabrous. *Leaves* opposite, evergreen, entire or dentate. *Flowers* small, axillary or terminal, fascicled or in very short racemes, hermaphrodite or polygamous. *Calyx* short, 4-toothed or -lobed. *Corolla-tube* short or long; lobes 4, broad, obtuse, imbricate. *Stamens* 2, more rarely 4, inserted on the corolla-tube; anthers ovate, sub-extrorsely dehiscent. *Ovary* 2-celled, ovules 2 in each cell, pendulous from its apex; style short or cylindric, 2-lobed or sub-entire. *Drupe* ovoid or globose; exocarp fleshy, endocarp bony or crustaceous. *Seeds* usually solitary, pendulous; testa thin; albumen fleshy; cotyledons flat; radicle short, superior.—DISTRIB. N.W. Himalaya and eastwards to China and Japan, also in Western North America; about 8 to 10 species.

OSMANTHUS SCORTECHINII, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height, and 10 to 15 in. in diam. of stem; branchlets terete with pale grey, somewhat corky, bark. *Leaves* coriaceous; lanceolate, shortly acuminate at apex, cuneate at base; both surfaces glabrous; margins entire, recurved; 2 to 4 in. long, .75 to 1.25 in. broad; midrib thick, impressed above, raised beneath; main-nerves very obscure, about 5 to 6 pairs; petiole broad, .3 to .6 in. long, channelled above and bordered by the decurrent margins of the blade. *Flowers* in very short, close, axillary racemes, reaching .5 in. long in fruit, supported by a pair of ovate, acute, coriaceous bracts; pedicels slender, .05 in. long. *Calyx* membranous, .06 in. long; lobes 4, slightly serrate. *Corolla* campanulate, tube .05 in. long; lobes .1 in. long, oblong, obtuse, margins incurved.

*Stamens* 4, slightly exsert, inserted between the corolla-lobes at the top of the tube; filaments slender; anthers small, ovate, cells dehiscing on the margins or somewhat extrorsely. *Ovary* conical, glabrous; style slender, subulate, .04 in. long; cells 2, ovules in each cell apparently 2. *Drupe* globose, .2 to .3 in. in diam.; dark greenish-blue when ripe, exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa membranous; albumen fleshy, ruminant; cotyledons oblong, flat, narrow; radicle superior.

PERAK: *Scortechini* 414—at Thaipeng; *Wray* 682; *King's Collector* 5029, 6978.

The structure of the wood, so far as the examination of a very small branch goes, confirms the placing of this plant in the genus *Osmanthus*.

To this species seems also to belong *King's Collector* 3663, which has a bright red drupe reaching .5 in. in length, slightly ribbed and with a spatulate embryo having the radicle nearly as long as the cotyledons, each .1 in. It may be called *Var. oblonga*.

### 3. LINOCIERA, Swartz.

Shrubs or trees. *Leaves* opposite, entire. *Flowers* small, in axillary or extra-axillary, rarely terminal, panicles or cymes; bracts generally small, sometimes rather enlarged and leafy; bracteoles very small. *Calyx* small, 4-fid or -toothed. *Corolla* of 4 petals, long or short, nearly free or cohering by pairs or very shortly connate, induplicate-valvate in bud. *Stamens* 2, rarely 4, inserted at the base of the petals and usually between the two cohering ones; filaments short; anthers elliptic or oblong, dehiscing on the margin or slightly extrorse; connective broad, often apiculate. *Ovary* 2-celled, ovules 2 in each cell, pendulous from its apex; style short; stigma bifid or entire. *Drupe* globose or ellipsoid; exocarp fleshy, thin, endocarp bony or crustaceous. *Seed* usually solitary, pendulous; testa thin; albumen fleshy or 0, if fleshy the cotyledons flattened, radicle superior.—*DISTRIB.* Tropics of both hemispheres, species about 40.

Leaves over 4 in. long, main-nerves prominent beneath:—

Panicles 4 to 6 in. long, drupe .75 in. long	..	1. <i>L. pauciflora</i> .
Panicles 2 to 4 in. long, drupe 1.7 in. long	..	2. <i>L. macrocarpa</i> .
Panicles 1.5 to 2 in. long, drupe not known	..	3. <i>L. paludosa</i> .
Leaves under 4 in. long, main-nerves obscure beneath, cymes scarcely 1 in. long	..	4. <i>L. caudata</i> .

1. *LINOCIERA PAUCIFLORA*, Clarke in Hook. f. Fl. Br. Ind. III. 609 (1882). A small tree, reaching 30 to 40 feet in height and 1.5 to 2 feet in diam. of stem; branches moderately stout, pale grey, smooth, swollen at the nodes, internodes slightly angular; branchlets darker coloured,

slender; leaf-buds linear-lanceolate. *Leaves* coriaceous; elliptic-oblong, rounded or shortly obtusely acuminate at apex, cuneate at base; glabrous on both surfaces, but with prominent raised glandular papillæ; 4 to 9 in. long, 2 to 4 in. broad; midrib stout, slightly impressed above, prominently raised beneath; main-nerves 11 to 13 pairs, fairly prominent and regular, curving upwards to and along the margin near which they anastomose; secondary nerves and reticulations obscure; petiole .7 to 1.3 in. long, thickened at base. *Flowers* pale yellow or white, in compound axillary panicles, 4 to 6 in. long; main branches 1 to 2 in. long; rachis slender, glabrous, somewhat angular; bracts leafy, ovate or spatulate, .5 to 1 in. or sometimes longer; bracteoles ovate-acute, very small; pedicels slender, .05 to 1.5 in. long, much thickened and pale in fruit even when quite young. *Calyx-tube* short; teeth 4, ovate-acute, .05 in. long. *Corolla-lobes* in two pairs, oblong, .1 to .15 in. long, slightly hairy within. *Stamens* .05 in. long; filaments short, broad, anthers elliptic, emarginate, with a gland on the front of the connective. *Drupe* ellipsoid, .75 in. long, .3 to .4 in. broad, blueish-black when ripe; exocarp fleshy, endocarp thin, crustaceous. *Seed* 1, testa pergamaceous; albumen none; cotyledons fleshy, .55 in. long; radicle very small, superior. *Olea* (?) *pauciflora*, Wall. Cat. 2812; A.DC. Prod. VIII. 288. *Chionanthus palembanica*, Miq. Fl. Ind. Bat. Suppl. 558; Kurz For. Fl. II. 159, and Journ. As. Soc. Beng. XLVI. ii. 243.

KEDAH: *Curtis*. PENANG: *Wallich* 2812A, B; *G. King*; *Curtis* 695, 2773; *King's Collector* 1693; *Ridley* 10178. PERAK: *Ridley* 7160; *Scortechini* 952; *King's Collector* 4172, 4834. SINGAPORE: *Ridley* 5079. —DISTRIB. Tenasserim, Andamans, Borneo (*Haviland* 1766).

2. *LINOCIERA MACROCARPA*, King & Gamble. A small tree; branchlets pale greyish-brown, stout, lenticellate; innovations ashy-pubescent. *Leaves* coriaceous; obovate-oblong or obovate-lanceolate, obtuse or very shortly and bluntly acuminate at apex, long cuneate at base; glabrous on both surfaces; margins entire or slightly recurved; 6 to 10 in. long, 2 to 3.5 in. broad; midrib very stout, broad and plane above, much raised beneath; main-nerves 14 to 17 pairs, prominent beneath, curved only near the margin to meet in a faint looped intramarginal nerve; secondary nerves and reticulations obscure; petiole 1 to 1.5 in. long, enlarged at base. *Flowers* in ashy-pubescent panicles, 2 to 4 in. long; bracts leafy, sometimes oblong-lanceolate, more generally spatulate; bracteoles linear-subulate, short; pedicels variable, often 0; rachis and pedicels much enlarged in fruit. *Calyx* pubescent; tube short; lobes ovate-acute, .05 in. long. *Corolla-tube* very short; lobes oblong-linear, .1 to .15 in. long, margins much incurved. *Stamens* .075 in. long; anthers oblong; filaments very short,

connective produced in a conical acumen. *Ovary* pubescent; style short; stigma 2-lobed. *Drupe* oblong-ellipsoid, 1.7 in. long, 1 to 1.2 in. broad; exocarp thick, granular; endocarp hard, .15 in. thick, obscurely ridged outside. *Seed* 1, testa membranous, albumen fleshy. *L. insignis*, Clarke in Hook. f. Fl. Br. Ind. III. 610. *Chionanthus macrocarpa*, Blume Mus. Bot. I. 319 (1849); Koord. & Val. Bijdr. VIII. 239. *C. insignis*, Miq. Fl. Ind. Bat. Suppl. 559 (1862). *C. montanus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 243, and For. Fl. II. 159.

SINGAPORE: at Bukit Mandai, *Ridley* 4580.—DISTRIB. Tenasserim (*Helfer* (K.D.) 3688), Martaban (*Kurz*), Sumatra (*Teysmann*, *Beccari* 826), Borneo (*Beccari* 725).

3. *LINOCIERA PALUDOSA*, King & Gamble, n. sp. A small tree (*Wray*), large tree, 60 to 80 feet high, and 15 to 20 in. in diam. of stem (*King's Collector*); branchlets thick, pale greyish-brown. *Leaves* coriaceous; oblong, bluntly acute at apex, also at base; glabrous on both surfaces except on the nerves which are minutely pubescent; margins recurved; 6 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, slightly raised above, strongly so beneath main-nerves 11 to 15 pairs, impressed above, prominently raised beneath, .75 to 1 in. apart, at first straight then curving upwards to and along the margin to anastomose and form a prominent looped intramarginal nerve; secondary nerves few; reticulations transverse, not prominent; petiole stout, wrinkled, .5 in. long. *Flowers* yellow, with a brown centre, in pubescent panicles 1.5 to 2 in. long from the branchlets between the leaf-nodes in the axils of small tubercles; peduncles stout, grey-pubescent, .2 in. long; bracts ovate, grey-pubescent; bracteoles ovate-acute, recurved; pedicels 0.5 in. long. *Calyx-tube* short, lobes ovate-acute or triangular, ciliate, .025 in. long, one lobe sometimes enlarged. *Corolla-lobes* in 2 pairs, linear-oblong, obtuse, .2 in. long, .05 in. broad, glabrous. *Stamens* .05 in. long; filaments broad, short; anthers rounded, connective with an obscure gland. *Ovary* conical, glabrous; style short; stigmas 2. *Fruit* not known.

PERAK: at Sungie Larút, *Wray* 2424; on low wet ground, *King's Collector* 6476.

4. *LINOCIERA CAUDATA*, King & Gamble, n. sp. A tree, reaching 30 to 40 feet in height and 5 to 7 in. in diam. of stem; branches slender, pale grey, ultimate branchlets darker. *Leaves* chartaceous; lanceolate, caudate-acuminate at apex, cuneate at base; glabrous on both surfaces; margins entire, recurved; 3 to 4 in. long, 1 to 1.25 in. broad; midrib slender, raised above, scarcely raised beneath; main-nerves very obscure, about 4 to 5 pairs, curving sharply upwards to meet in an intramarginal looped nerve; petiole .1 to .2 in. long, grooved above.



*Flowers* in axillary or extra-axillary, few-flowered, trichotomous, paniculate cymes about 1 in. long; rachis glabrous, somewhat angular; bracts and bracteoles small, ovate, acute. *Calyx* .05 in. long, tube short; lobes 4, ovate, obtuse. *Corolla-tube* scarcely any; lobes in 2 pairs, oblong, .1 in. long. *Stamens*: filaments broad; anthers oblong, cells extrorsely dehiscing; connective apiculate. *Ovary* glabrous, conical; style very short; stigma bifid. *Drupe* (immature) obovoid, .3 to .4 in. long, seed apparently albuminous.

PERAK: *King's Collector* 3212, 6857, in dense jungle on high mountains at 3,500 to 4,000 feet.

This species is rather near *L. monticola*, Bl., but the leaves are narrower and the inflorescence longer.

#### 4. OLEA, Linn.

Trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* small; hermaphrodite, diœcious or polygamous; in axillary, rarely terminal trichotomous panicles; bracts small. *Calyx* short, 4-toothed or -lobed. *Corolla-tube* short; lobes 4, induplicate-valvate, sometimes 0. *Stamens* 2, on the corolla-tube or sub-hypogynous; filaments short; anthers ovate or oblong, cells dehiscing on the margin or slightly extrorse, in ♂ flowers sometimes introrse. *Ovary* 2-celled; ovules 2 in each cell, attached laterally to the septum or sub-pendulous; style short; stigma obtuse, capitate or bifid. *Drupe* ellipsoid or sub-globose; exocarp fleshy; endocarp bony or crustaceous, usually 1-seeded. *Seed* pendulous; testa thin; albumen fleshy, sometimes slightly ruminant; cotyledons flat, radicle superior.—DISTRIB. South Europe and Asia, tropical and South Africa, New Zealand; about 35 species.

Inflorescence more than 3 in. long; leaves oblong lanceolate, acute, usually over 4 in. in length . . . . . 1. *O. dentata*.

Inflorescence under 3 in. long; leaves elliptic-lanceolate, acuminate, under 4 in. in length . . . . . 2. *O. maritima*.

#### SPECIES IMPERFECTLY KNOWN.

Leaves 8 to 14 in. long; inflorescence extra-axillary on old wood; drupes flattened . . . . . 3. *O. platycarpa*.

Leaves 2 to 3 in. long; inflorescence axillary or extra-axillary on young wood; corolla-lobes linear, .1 in. long; drupes not known . . . . . 4. *O. ardisioides*.

1. *OLEA DENTATA*, Wall. Cat. 2840 (1829). A tree, 40 to 60 feet high; branchlets light brown, smooth, innovations minutely pubescent. *Leaves* coriaceous; oblong-lanceolate, bluntly acute at apex, cuneate or rounded at base; glabrous on both surfaces, but when young pubescent on the nerves beneath; margins entire or distantly dentate, slightly recurved; 3.5 to 5.5 in. long, 1 to 2 in. broad; midrib slender, im-

pressed above, raised beneath; main-nerves obscure, 8 to 10 pairs, arching upwards to join in a looped nerve near the margin, impressed above; petiole .4 in. long. *Flowers* in axillary or extra-axillary, leafy, tri-pinnate, minutely pubescent, paniculate cymes, 3 to 6 in. long, branches trichotomous, ultimate cymes umbellate; bracts leafy, oblong or lanceolate, .5 to 1.5 in. long; pedicels slender, .05 to .1 in. long; bracteoles minute, ovate-acute. *Calyx* minutely pubescent, .05 in. long; lobes 4, ovate, obtuse. *Corolla* tubular-campanulate, .15 in. long; lobes 4, rounded, .05 in. long. *Stamens* very small, inserted at the base of the corolla-tube; filaments very short; anthers ovoid, sub-extrorsely dehiscent. *Ovary* ovoid; style none; stigma capitate; cells 2, ovules 2 in each cell. *Drupe* not seen. A.DC. Prod. VIII. 286; Kurz in Journ. As. Soc. Beng. XLVI. ii. 245, and For. Fl. II. 157; Clarke in Hook. f. Fl. Br. Ind. III. 613.

PENANG: *Curtis* 222, 950, 2267.—DISTRIB. Burma.

2. *OLEA MARITIMA*, Wall. Cat. 2813 (1829). A large shrub or small tree; branchlets terete, pale brown; innovations minutely pubescent. *Leaves* coriaceous; elliptic-lanceolate, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces; margins entire or distantly serrate on their upper half; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, impressed above, raised beneath; main-nerves obscure, 7 to 10 pairs, meeting near the margin in a looped intramarginal nerve; reticulations scanty; petiole .2 to .3 in. long, minutely pubescent when young, finally glabrous. *Flowers* dull white, polygamous, in slender, minutely pubescent, trichotomous paniculate cymes with few branches; ultimate cymes umbellate, usually .75 to 1 in. long in flower, up to 1.5 in. long in fruit, rarely axillary, usually extra-axillary; each pair of peduncles supported by a pair of ovate lanceolate leafy bracts .3 to .5 in. long; common peduncles .7 in. long; pedicels .05 to .1 in. long, bracteoles none. *Calyx* .05 in. long, minutely rusty-pubescent; tube short; lobes 4, ovate-acute, as long as tube. *Corolla* campanulate, .1 to .15 in. long; lobes 4, obtuse, as long as tube, induplicate-valvate, apparently absent in ♀. *Stamens* .07 in. long, inserted near the base of the corolla-tube; filaments slender; anthers as long as filaments, reniform, cells sub-extrorsely dehiscent. *Ovary* conical; style none; stigma capitate; cells 2, ovules in each cell pendulous. *Drupe* globose, .2 in. in diam., black when ripe, wrinkled when dry; exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa very thin, albumen copious; cotyledons elliptic, nearly .1 in. long; radicle somewhat thick. G. Don Gen. Syst. IV. 49; A.DC. Prod. VIII. 288; 288; Clarke in Hook. f. Fl. Br. Ind. III. 612; Miq. Fl. Ind. Bat. II. 547.

MALACCA : *Griffith* (K.D.) 3679 ; *Maingay* (K.D.) 1022 ; *Cuming* 2318 ; *Ridley* 3284, 10731. PAHANG : a common bush on the sandy heaths, *Ridley* in Trans. Linn. Soc. Ser. 2. III. 319. SINGAPORE : *Wallich* 2813 ; *Walker* 183 ; *Ridley* 3616A, 8420 ; *King's Collector* 1138 ; *Murton* 62.—DISTRIB. Malay Islands.

## SPECIES IMPERFECTLY KNOWN.

3. *OLEA PLATYCARPA*, King & Gamble, n. sp. A small tree with spreading branches, reaching 25 to 30 feet in height; branchlets stout, pale brown, smooth, marked by the prominent horse-shoe-shaped scars of fallen leaves. *Leaves* coriaceous; obovate-oblong or oblong-lanceolate, abruptly acuminate at apex, cuneate at base; glabrous on both surfaces and with scattered glands; margins entire, slightly recurved; 8 to 14 in. long, 3 to 5 in. broad; midrib very stout and prominent; main-nerves 14 to 16 pairs, curving upwards to join in a looped intramarginal nerve close to the margin; secondary nerves few; reticulations irregular, obscure; petiole 1 in. long, base enlarged, wrinkled. *Flowers* dioecious, in extra-axillary, sessile, paniculate, trichotomous cymes, usually on old wood, 1 to 1.5 in. long, supported by a cluster of sheathing scarious bracts; bracts of panicle branches and bracteoles ovate-acute; pedicels very short, stout, somewhat angular. *Calyx* short, .05 in. long; teeth (in ♀ flowers) ovate, obtuse, ciliate. *Corolla* none in ♀, ♂ not seen. *Ovary* conical, rugose; style 0; stigma 2-lobed, mitriform. *Drupe* ovate-oblong, flattened, .7 in. long, .5 in. broad; exocarp thick, wrinkled when dry; endocarp thick, granular; cells 2. *Seed* 1, pendulous from the summit of the thin central persistent septum; testa membranous; albumen thick, fleshy; cotyledons ovoid, .15 in. long, radicle rather stout.

PERAK : at low levels on the hills, *King's Collector* 5541, 7649; *Hervey*.

The absence of male flowers renders the identification of the genus of this plant somewhat uncertain, but we consider it belongs rightly to *Olea*.

4. *OLEA ARDISIODES*, King & Gamble, n. sp. A small tree; branches slender, terete, with yellowish bark; branchlets minutely pubescent. *Leaves* coriaceous; lanceolate, long acuminate at apex, cuneate at base; glabrous on both surfaces; margins entire, recurved; 2 to 3 in. long, .6 to .1 in. broad; midrib slender, impressed above, raised beneath; main-nerves 5 pairs, curving upwards to meet in a looped intramarginal nerve, obscure; secondary nerves and reticulations very obscure; petiole slender, .1 to .2 in. long. *Flowers* in axillary or extra-axillary

slender paniculate cymes, 1 to 2 in. long; rachis somewhat angular, minutely pubescent; bracts leafy, lanceolate, .5 to 1 in. long; bracteoles similar or sometimes subulate-spathulate; pedicels slender, .1 in. long, reflexed. *Calyx-tube* very short; lobes 4, ovate-acute, .025 in. long, ciliate. *Corolla-tube* .03 to .05 in. long; lobes 4, induplicate-valvate, linear, .1 in. long. *Stamens* 2, inserted at the base of the corolla-tube, .05 in. long; filaments slender; anthers elliptic, cells dehiscent laterally, connective mucronate. *Ovary* conical; style 0; stigma minute, bifid; cells 2. *Fruit* not seen.

PERAK: on Gunong Bubu, 5,000 feet, Wray 3871. PAHANG: Barnes 10896.

We have hesitated whether to describe this species as *Olea* or *Linociera*, for the corolla-tube is not very long, and the lobes are like those of the latter genus, but the character of the leaves is distinctly that of *Olea*.

#### 5. MYXOPYRUM, Blume.

Large scandent shrubs with quadrangular branches. *Leaves* opposite, large, triplinerved, entire or denticulate. *Flowers* small, yellow, very numerous, in axillary and terminal trichotomous panicles. *Calyx-tube* short, lobes 4. *Corolla* fleshy; tube urceolate; lobes 4, concave, induplicate-valvate in bud. *Stamens* 2, inserted on the base of the corolla-tube; filaments very short; anthers rather large, ovate, cells dehiscent laterally. *Ovary* 2-celled; style very short or 0, stigma 2-lobed; ovules 1 to 2 in each cell, attached near the base at the inner angle. *Fruit* a 1-2-seeded sub-globose berry; pericarp crustaceous. *Seeds* 1 to 4, erect, testa membranous, albumen thick; cotyledons flat, ovate, radicle inferior.—DISTRIB. India and Malaya, 3 species.

MYXOPYRUM NERVOSUM, Blume Bijdr. 683 (1826). A large climbing shrub; branches with fibrous pale brown bark; branchlets prominently quadrangular. *Leaves* coriaceous; elliptic or elliptic-oblong or elliptic-lanceolate, acuminate at apex, cuneate or rounded at base; glabrous on both surfaces; margins entire or denticulate in the upper half, prominently recurved; 4 to 7 in. long, 1.5 to 3.5 in. broad; midrib thick, prominent beneath, impressed above; main-nerves 4 to 6 pairs, the lowest pair opposite, very prominent, starting a little above the base and forming an intramarginal nerve looped only after where it meets the rest at about two-thirds of the way up, the next pair not opposite and only starting from about half the length of the leaf; secondary nerves few, reticulations irregular, prominent in dry specimens; petiole .3 to .5 in. long, often twisted, channelled above, articulate at the base. *Flowers* sessile, in terminal or axillary or extra-axillary, trichotomous, minutely



pubescent panicles, 1·5 to 3 in. long; rachis angular, swollen at the nodes; bracts subulate, recurved, ·1 in. long; bracteoles triangular, minute. *Calyx-tube* very short; lobes 4, triangular, acuminate. *Corolla* yellowish- or greenish-white, fleshy; tube urceolate, ·05 to ·1 in. long; lobes oblong, incurved, ·05 in. long, induplicate-valvate in bud. *Stamens* 2, inserted on the tube of the corolla; filaments very short, broad; anthers ovate, rather large. *Ovary* ovoid; style 0; stigma 2-lobed; cells 2, ovules 2 in each cell, erect from a minute basal central placenta. *Berry* ovoid or globose, ·5 to ·7 in. in diam., rough, surmounted by the persistent stigma, blueish-black when ripe; cells 2. *Seeds* 2 to 4, erect on an enlarged placenta at the base of the central dissepiment; albumen fleshy, testa membranous. Mus. Bot. Lugd. Bat. I. 320, t. 51; A.DC. Prod. VIII. 290; Miq. Fl. Ind. Bat. II. 549; Clarke in Hook. f. Fl. Br. Ind. III. 618.

PENANG: *Curtis* 2849. PERAK: *Wray* 2139, 2834, 4179; *Scortechini* 532, 598b; *King's Collector* 3584, 4544, 7392, 8845. MALACCA: *Main-gay* (K.D.) 996/3—DISTRIB. Sumatra (*Forbes* 1585, in the Lampongs); Java.

LONDON  
PRINTED BY WEST, NEWMAN AND CO.  
HATTON GARDEN

# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV., PART II.—Extra Number, 1905.

---

*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 18.

This part contains nine Natural Orders, viz., Nos. 79 *Hydrophyllaceæ* to 85 *Lentibulariaceæ* inclusive, as well as Nos. 87 *Bignoniaceæ* and 88 *Pedaliaceæ*. The whole part is the work of Lieut.-Col. D. Prain, I.M.S., F.R.S., Superintendent of the Royal Botanic Garden, Calcutta, with the exception of *Boraginaceæ*, which has been done by Sir George King, and *Hydrophyllaceæ* and *Bignoniaceæ*, which have been done by Mr. Gamble.

The nine Orders dealt with contain 53 genera and 150 species : of the species none are here described for the first time.

Natural Order No. 86 *Gesneraceæ* will follow later on with the three Orders, 75 *Apocynaceæ*, 76 *Asclepiadaceæ*, and 77 *Loganiaceæ*, the preparation of which is not yet quite complete.

### Order LXXIX. HYDROPHYLLACEÆ.

Annual or perennial herbaceous plants. *Leaves* radical or alternate, rarely opposite, entire or dentate, simple or pinnately or palmately lobed. *Flowers* usually unilaterally sub-sessile on the branches of a bifid or dichotomous scorpioid cyme, or else pedunculate in the axils or on the summits of the branches ; regular, hermaphrodite. *Calyx*

inferior, with 5 or occasionally many equal imbricate lobes. *Corolla* gamopetalous, funnel-shaped cup-shaped campanulate or rotate; lobes 5, rarely many, imbricate or sometimes twisted. *Stamens* as many as the corolla-lobes, alternate with them, usually fixed to the base of the tube, exsert or included; filaments filiform, sometimes dilated or appendiculate at base; anthers ovate, oblong or linear, dorsifixed; cells 2, parallel, dehiscing introrsely with longitudinal clefts. *Ovary* superior, sometimes unilocular, with 2 free or parietal placentas, sometimes more or less completely 2-celled with fleshy placentas adnate to the septum; styles either 1 filiform bifid or undivided, or 2 distinct from the base; stigmas terminal, small or capitate; ovules 2 to many in each cell. *Capsule* loculicidally, sometimes septicidally, bi-valved, the placentas if parietal attached to the valves, if central remaining free. *Seeds* usually oblong, globose or angular, 2 to many on each placenta; testa reticulate or wrinkled, rarely smooth; albumen fleshy, embryo small, erect; cotyledons plano-convex or semi-terete.—DISTRIB. About 150 species, chiefly American, very few in the Old World.

#### HYDROLEA, Linn.

Herbs or undershrubs. *Leaves* entire, alternate. *Flowers* blue, in short terminal cymes or racemes. *Calyx* divided nearly to the base, segments lanceolate. *Corolla* widely campanulate, sub-rotate, lobes imbricate. *Stamens* 5, attached to the corolla-tube; filaments filiform, sometimes dilated at base; anthers sagittate. *Ovary* completely 2-celled, with fleshy placentas adnate to the dissepiment; styles 2, rarely 3, distinct, filiform; stigmas capitellate; ovules many in each cell, multi-seriate. *Capsule* globose or ovoid, septicidal, usually 2-, rarely 3- or 4-valved. *Seeds* minute, irregularly wrinkled.—DISTRIB. About 14 species, chiefly American, with one Chinese, one of tropical Africa, and one of India and Malaya.

HYDROLEA ZEYLANICA, Vahl Symb. II. 46 (1791). An annual herb; stems nearly glabrous below, glandular pubescent above, soft, somewhat succulent, often rooting, always straggling. *Leaves* membranous; lanceolate or oblong-lanceolate, attenuate above and below; .5 to 2 in. long, .2 to .5 in. broad; glabrous or slightly pubescent; petiole none or very short and winged by the decurrent blade. *Flowers* in racemes on short lateral leafy branches. *Calyx-lobes* acute, glandular-pubescent, 3-nerved, about .3 in. long. *Corolla-lobes* ovate, .2 in. long, many-nerved, blue. *Stamens* with sagittate, often twisted anthers, and filaments dilated at base. *Capsule* shorter than the calyx-lobes, ovoid, 2-lobed; placentas central, adherent at their backs to the dissepiment. *Seeds* very many,



oblong, obtuse, testa very faintly wrinkled. Lamk III. t. 184; Wall. Cat. 4398; W. & A. in Hook. Comp. Bot. Mag. II. 193, t. 26; Wight III. t. 167, and Ic. t. 601; Choisy in DC. Prod. X. 180; Dalz. & Gibbs. Bomb. Fl. 170; Miq. Fl. Ind. Bat. II. 633; Clarke in Hook. f. Fl. Br. Ind. IV. 133; Trimen Fl. Ceyl. III. 191. Cooke Bomb. Fl. II. 197; Prain Beng. Plants 711. *H. javanica*, Blume Bijdr. 725. *Namazeylanica*, Linn. Sp. Pl. 226; Roxb. Fl. Ind. II. 73. "Tsjeru Vallel," Rheede Hort. Mal. X. t. 28.

PERAK: Wray 2571, 3336; *Scortechini*; Ridley 2906; *King's Collector* 391, 2577.—DISTRIB. Throughout India, Ceylon, Burma, Siam, Java, Malaya, China, the Philippines; also in Australia, tropical Africa and America, in wet places and rice-fields.

#### Order LXXX. BORAGINÆ.

Herbs, shrubs, or trees, often conspicuously hispid or scabrous. *Leaves* alternate, very rarely opposite, ex-stipulate, usually entire, rarely in verticils. *Flowers* usually in scorpioid dichotomous cymes, sometimes trichotomously paniculate, rarely solitary and axillary, bracteate or not, hermaphrodite. *Calyx* inferior, 5-lobed (rarely 6- to 8-lobed), the lobes imbricate, rarely valvate, usually persistent in fruit. *Corolla* gamopetalous, of various forms, often with scales in the throat; the limb 5-lobed (rarely 4- to 6-lobed), the lobes imbricate, rarely twisted. *Stamens* as many as the lobes and alternate with them, inserted on the tube; anthers ovate to linear, introrse; filaments slender, often dilated at the base. *Disk* under the ovary or obsolete. *Ovary* superior, sessile, cells 2 with 2 ovules in each, or 4 with 1 ovule in each; style terminal or from the depression between the lobes of the ovary, long or short; stigma entire and capitate or 2-lobed, the style rarely twice bifid; ovules sub-erect from the basal angle of the cell. *Fruit* drupaceous with a hard 2- to 4-celled endocarp or dividing into 2 or 4 nutlets with thin or fleshy walls. *Seeds* erect or oblique, with membranous testa and fleshy albumen or ex-albuminous; embryo curved or straight, radicle superior.—DISTRIB. Universal. Species about 1,500.

Styles twice partite; drupe 4-1-seeded; trees or shrubs; calyx enlarging in fruit .. .. . 1. *Cordia*.

Styles simple or only bi-partite; rarely (*Coldenia*) 2 or more and distinct; drupe including two 2-seeded or four 1-seeded pyrenes; calyx only slightly or not at all enlarged in fruit:—

Styles depressed-conical at the apex or with a horizontal ring below or at the stigmas:—

- Styles short, shortly 2-lobed; pyrenes two 2-seeded; herbs or shrubs .. .. 2. *TOURNEFORTIA*.  
 Styles elongated, dilated at the apex; pyrenes four 1-seeded, much resembling nutlets; herbs .. .. 3. *HELIOTROPIMUM*.  
 Styles elongated, not dilated or annular at the apex, more or less bi-partite:—  
 Styles 2-fid at the apex; pyrenes two 2-seeded, or four 1-seeded; trees or shrubs .. .. 4. *EHRETIA*.  
 Styles more or less separate, distinct at base and apex, united but easily separable in the middle; pyrenes four 1-seeded, much resembling nutlets; prostrate herbs .. 5. *COLDENIA*.

1. *CORDIA*, Linn.

Trees or shrubs. *Leaves* alternate, rarely sub-opposite, petiolate. *Flowers* in dichotomous cymes with scorpioid branches, or corymbose or in clusters, ebracteate, polygamous, the ♀ fewer than the ♂. *Calyx* tubular or campanulate, usually with short and often irregular teeth, accrescent in fruit. *Corolla* funnel- or salver-shaped or campanulate; the lobes of the limb 4 to 8, spreading or recurved, white or orange. *Stamens* as many as the lobes; anthers sagittate or hastate, shortly exerted; filaments often hairy near the base. *Ovary* 4-celled, glabrous; style terminal, long, bi-partite, the branches again bifid, linear or sub-spathulate, cells of ovary 1-ovuled. *Fruit* ovoid or ellipsoid, surrounded by the enlarged calyx; the putamen bony, with 1 to 4 cells, but one only with a fertile seed. *Seed* exalbuminous, the cotyledons large and fleshy or thin but always plicate.—*DISTRIB.* About 280 species, all tropical.

- Flowers about 1·5 in. long .. .. 1. *C. subcordata*.  
 Flowers less than ·5 in. long:—  
 Leaves broadly ovate, sub-acute or obtuse, the base often cordate 2. *C. Myxa*.  
 Leaves ovate-lanceolate, acuminate, the base cuneate .. 3. *C. Griffithii*.

1. *CORDIA SUBCORDATA*, Lamk III. 1899 (1792). A small tree; young branches as thick as a goose-quill, glabrous, pale brown when dry. *Leaves* membranous; broadly ovate or ovate-rotund, the apex acute, the base broadly rounded or sub-cordate; both surfaces brown when dry, the lower paler, harshly and minutely reticulate; main-nerves 4 or 5 pairs, faint on both surfaces when dry; length 3·5 to 6·5 in., breadth 2·5 to 4 in.; petiole 1·25 to 2 in. *Corymbs* lateral, few-flowered, shorter than the leaves, glaberulous; pedicels ·25 in. long. *Calyx* cylindric, slightly widening towards the mouth, ·4 in. long and nearly ·2 in. wide at the middle, glabrous; the limb with 3 broad triangular teeth. *Corolla* about 1·3 in. long, orange or reddish, funnel-shaped; lobes about 6, broad, spreading, as long as the tube. *Stamens* 6.

*Stigma* with linear-spathulate branches. *Fruit* very bony, pyramidal, its apex acute, with 4 bold angles, the spaces between the angles often with large tubercles, 1 in. long and as much in breadth from angle to angle, usually with 1 or more seeds; entirely enveloped in the much-inflated glabrous accrescent apiculate calyx. Wall. Cat. 9063; DC. Prod. IX. 477; Seem. Fl. Viti, t. 34; Benth. Fl. Austral. IV. 385; Kurz For. Fl. Burm. II. 209; Clarke in Hook. fil. Fl. Br. Ind. IV. 140; Miq. Fl. Ind. Bat. II. 914. *C. orientalis*, R. Br. Prod. 498. *C. campanulata*, Roxb. Fl. Ind., ed. Carey & Wall. II. 336. *C. Rumphii*, Blume Bijdr. 843. *C. hexandra*, Roem. & Schult. Syst. IV. 799. Rumph. Herb. Amb. II. t. 75.

PERAK: *Scortechini* 1084. DINDINGS: *Curtis* 3447. KEDAH: *Ridley* 5526. PAHANG: *Ridley* 2158.—DISTRIB. British India, Malay Archipelago, Australia, Sandwich Islands. Widely cultivated in other places.

2. *CORDIA MYXA*, Linn. Sp. Pl. 190 (1753). A tree, 40 to 50 feet high; young branches thinner than a goose-quill, glabrous. *Leaves* thinly coriaceous; broadly ovate, apex sub-acute or obtuse, the base slightly cordate; upper surface when dry dark brown, glabrous, faintly reticulate; the lower paler brown, distinctly and minutely reticulate, the transverse veins very prominent, glabrous except for some pubescence on the midrib and 5 or 6 pairs of curved ascending main-nerves; length 3 to 3.75 in., breadth 2 to 2.75 in.; petioles .75 to 1.25 in. *Cymes* trichotomous, shorter than the leaves, terminal. *Male and female* flowers often in the same tree, mostly 5-merous. *Calyx* campanulate, more than .25 in. long, glabrous, smooth outside, silky inside. *Corolla* with its tube included in the calyx, the lobes projecting and .15 in. long, reflexed; style in the ♀ flowers short, 4-cleft, absent in the ♂. *Fruit* ellipsoid, with acute apex and rounded base, compressed, with 3 or 4 angles (one or more of them indistinct), .75 in. long and .4 in. broad, 2- or more-seeded; the persistent accrescent calyx leathery with strong vertical reticulations, widely campanulate, its mouth with shallow irregular crenations, length .25 in., width .4 to .5 in. DC. Prod. IX. 479; Delile Fl. Ægypt. t. 19, fig. 1; Roxb. Fl. Ind., ed. Carey & Wall., II. 232; Wall. Cat. 889; Wight Ill. t. 169; Benth. Fl. Austral. IV. 386; Bedd. Fl. Sylv. t. 245, fig. A; Brandis For. Fl. 336 (*in part*); Kurz For. Fl. Burm. II. 208; Boiss. Fl. Or. IV. 124; Miq. Fl. Ind. Bat. II. 915; Clarke in Hook. fil. Fl. Br. Ind. IV. 136; Trimen Fl. Ceyl. III. 193; Cooke Fl. Bomb. II. 199; Prain Beng. Plants 714. *C. Myxa*, var. *b. minor only*, Thw. Enum. Pl. Zeyl. 214. *C. indica*, Lamk Diet. VII. 49; DC. Prod. IX. 500. *C. officinalis* and *C. africana*, Lamk Ill. II. 420, and t. 96, fig. 3. *C. Sesbestena*, Forsk. Fl. Aeg.-Arab. LXIII. *C. paniculata*, Roth Nov. Spec. 124; DC. Prod.

IX. 482. *Sebestena officinalis*, Gaertn. Fruct. I. 364, t. 76. *Ehretia glabra*, Roth Nov. Spec. 127; DC. Prod. IX. 510. *Beurreria glabra*, G. Don Gen. Syst. 390.

MALACCA and SINGAPORE : probably introduced.—DISTRIB. Tropics of the Old World.

3. *Cordia Griffithii*, Clarke in Hook. fil. Fl. Br. Ind. IV. 139 (1883). A small tree; young branches about as thick as a crow-quill, puberulous, pale and angled when dry. *Leaves* thinly coriaceous; ovate-lanceolate, acute or acuminate, the base slightly cuneate; both surfaces brown when dry (the lower the paler), minutely reticulate, glabrous; main-nerves 3 or 4 pairs, curved, ascending; length 1·5 to 3·5 in., breadth 1 to 1·75 in.; petioles ·65 to 1·25 in. *Cymes* slender, 2·5 to 4 in. long (including their peduncles), dichotomous, lax, few-flowered, puberulous. *Flowers* ·4 in. long, almost sessile. *Calyx* ·25 in. long, funnel-shaped; the mouth wide, oblique, and with 5 irregular short teeth. *Corolla* funnel-shaped, much longer than the calyx; the limb longer than the tube, deeply divided into 5 narrowly elliptic reflexed lobes. *Stamens* 5, attached to the throat of the tube; anthers oblong, exserted; filaments unequal in length, flattened below. *Ovary* obovoid, smooth, 4-celled, ovules solitary in each cell; style thin and cylindric above, swollen in its lower half, exserted.

MALACCA : *Griffith* (K.D.) 5997; *Maingay* (K.D.) 1162; *Ridley* 4561. SELANGOR : *Ridley* 7373. KEDAH : *King's Collector* 1742.

## 2. *TOURNEFORTIA*, Linn.

Trees or shrubs, sometimes almost herbs, and often sub-scandent. *Leaves* alternate, entire. *Cymes* scorpioid, dichotomous, usually terminal, rarely lateral or extra-axillary. *Flowers* small, numerous, crowded, sessile or on short pedicels, ebracteate. *Calyx* deeply 4- or 5-partite, the segments ovate or lanceolate. *Corolla* white or greenish; the tube cylindric, naked in the throat; the lobes of the limb 5 or 4, small, spreading. *Stamens* 5 or 4, included in the tube; anthers oblong-ovate or lanceolate, apiculate or not; filaments short. *Ovary* 4-celled; style terminal, short, 2-lobed (in the Indo-Malayan species); ovules 1 in each cell, pendulous from the upper inner part of the cell. *Drupe* small, ovoid, slightly fleshy or leathery, indistinctly separating into two 2-seeded or into four 1-seeded pyrenes. *Seeds* straight or curved, pendulous, albuminous; embryo straight or curved.—DISTRIB. About 130 species, in the tropics of both hemispheres.

*TOURNEFORTIA WALLICHII*, DC. Prod. IX. 527 (1845). A climber, 10 to 30 feet long; young branches terete, twice as thick as a crow's-quill, minutely rusty-puberulous, becoming glabrous. *Leaves* thickly mem-



branous; ovate, the apex acute or shortly acuminate, the base rounded, slightly oblique; both surfaces when dry brown, the upper quite glabrous, the lower paler, reticulate, sometimes with a few small hairs on the nerves; main-nerves 4 or 5 pairs, curved, ascending, depressed like the midrib on the upper surface, prominent on the lower; length 2 to 3.5 in., breadth .75 to 1.75 in.; petioles .3 to .4 in. *Cymes* terminal and lateral (extra-axillary), on long peduncles, dichotomously branched, sub-glabrous. *Flowers* .3 to .4 in. long, sessile, forming crowded one-sided pseudo-spikes (scorpioid cymes) on the terminal inch or two of the branches of the cymes. *Calyx* about .05 in. long, only about a sixth or a seventh as long as the corolla, cleft nearly to the base into 4 broadly triangular acute spreading segments. *Corolla-tube* 4-angled; the limb short, with 4 ovate teeth, glabrous. *Anthers* 4, oblong, sessile or nearly so, near the throat. *Fruit* broadly ovoid, .15 to .2 in. long, with 4 vertical grooves (2 of them deep) on the sides, and a depression on the apex. Clarke in Hook. fil. Fl. Br. Ind. IV. 147. *T. tetrandra*, Wall. Cat. 911 (not of Blume). *Tetrandra Wallichii*, Miq. Fl. Ind. Bat. II. 928.

SINGAPORE: *Maingay* (K.D.) 1165, 8041; *King's Collector* 302. PERAK: *Wray* 3536; *Ridley* 2431; *King's Collector* 3335, 5158 *Scortechini* 1494.—DISTRIB. Java, Sumatra.

### 3. HELIOTROPIMUM, Linn.

Annual or perennial herbs, very hairy or scabrous. *Leaves* alternate. *Flowers* small, white, or pale purple, sometimes in terminal dichotomous cymes with scorpioid branches and small or no bracts, sometimes axillary in the axils of large bracts. *Calyx* divided into 5 linear or lanceolate segments. *Corolla* with a cylindric tube and limb of various shapes, the lobes of the latter always imbricate or induplicate in bud, spreading in flower. *Stamens* 5, included, inserted on the tube by short filaments; anthers ovate-oblong or lanceolate. *Ovary* completely or imperfectly 4-celled, 4-ovulate; style short or long, terminal, with a depressed conical or flat disk on its apex; stigma above the disk, none or short or elongate, entire or rarely bifid. *Fruit* dry, 2- to 4-grooved or -lobed, and consisting of 4 nutlets free from the beginning or finally becoming so. *Seeds* straight or curved; albumen none, small or large; cotyledons plano-convex.—DISTRIB. Species about 225, widely distributed in both hemispheres.

Leaves ovate-lanceolate, 1.5 to 2.5 in. long ..	..	..	1. <i>H. indicum</i> .
Leaves linear, .5 to 1 in. long ..	..	..	2. <i>H. strigosum</i> .

1. HELIOTROPIMUM INDICUM, Linn. Sp. Pl. 130 (1753). Herbaceous,

but woody at the base, a foot or two in height, with few branches; the branches, lower parts of the inflorescence, and the petioles with white stiff hairs. *Leaves* membranous, greenish-brown when dry; ovate or ovate-lanceolate, slightly inequilateral, the apex usually acute, the base rounded, irregularly cordate, often unequally so; both surfaces with some scattered long white hairs; the lower surface pale and faintly reticulate when dry; main-nerves 6 to 8 pairs, rather straight, ascending, slightly prominent on the lower surface; length 1.5 to 2.5 in., breadth .75 to 2 in.; petioles .4 to 1.5 in. *Cymes* scorpioid, terminal and lateral (extra-axillary), about 2 in. long (lengthening with age to 5 or 6 in.), on peduncles about 1 in. long; the rachises hispid, compressed when dry. *Flowers* about .15 in. long, sessile, numerous. *Calyx* about .05 in. long, deeply divided into 5 narrowly lanceolate sub-erect hispid segments. *Corolla* tubular, slightly dilated at the base; the limb with 5 broad blunt reflexed lobes; anthers 5, included, inserted about the middle of the tube. *Fruit* .1 in. long, conical, with an apical beak and with 4 bold vertical ridges and 4 faint ones, glabrous naturally separating into 2 halves, each half consisting of 2 cohering pyriform pyrenes with long beaks and a single large sub-quadrate white seed. Roxb. Fl. Ind. I. 454; Bot. Mag. t. 1837; Clarke in Hook. fil. Fl. Br. Ind. IV. 152; Trimen Fl. Ceyl. III. 200; Cooke Fl. Bomb. II. 207; Prain Beng. Plants 716. *H. anisophyllum*, Beauv. Fl. Ow. et Ben. II. 62, t. 96. *Traridium indicum*, Lehm. Asperifol. 14; Wall. Cat. 913; Wight III. t. 171. *T. anisophyllum*, G. Don Gen. Syst. IV. 364. *Heliophyllum indicum*, DC. Prod. IX. 556; Fresen. in Mart. Fl. Brasil, fasc. 22, 48, t. 10, fig. 4; Miq. Fl. Ind. Bat. II. 925. *H. velutinum*, DC. l.c. 557.

SINGAPORE: *King's Collector* 318; *Hullett* 21. PAHANG: *Ridley* 1547. PENANG: *Deschamps*. PERAK: *Scortechini* 163.—DISTRIB. India, Malaya, E. Asia, tropical Africa and America.

2. *HELIOTROPIMUM STRIGOSUM*, Willd. Sp. Pl. I. 743 (1797). Herbaceous, woody at the base, erect, a foot high, the branches few, slender, long, not spreading, very strigose, like all the rest of the plant. *Leaves* linear, .5 to 1 in. long, very narrow, becoming smaller upwards. *Flowers* under .1 in. long; their pedicels longer, sub-opposite to a linear bract or often extra-axillary. *Sepals* ovate-acute, enlarging in fruit. *Corolla* salver-shaped; stigma narrowly conical. *Fruit* depressed, 4-lobed, under .1 in. broad, glabrous and shining, sometimes with a few small hairs. DC. Prod. IX. 546; Clarke in Hook. fil. Fl. Br. Ind. IV. 151; Boiss. Fl. Orient. IV. 143; Prain Beng. Plants 716. *H. brevifolium*, Wall. Cat. 914; Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 2; DC. l.c. 546. *H. compactum*, Don Prod. 101.

In all the provinces, by waysides, not common.—DISTRIB. From W. Asia through India to Australia.

#### 4. EHRETIA, Linn.

Glabrous or scabrous shrubs or trees. *Leaves* alternate, entire or dentate. *Flowers* small, usually white, in axillary or terminal corymbs or panicles, rarely on 1-flowered axillary peduncles. *Calyx* small, 5-partite. *Corolla* with short cylindric tube; the limb with 5 obtuse imbricate spreading lobes. *Stamens* 5, inserted on the tube, exserted, rarely included, ovate or oblong. *Ovary* 2-celled, the cells bi-ovulate; sometimes imperfectly 4-celled and the cells with solitary ovules; style terminal, cylindric, bifid or bi-partite; stigmas small, capitate or clavate. *Drupe* small, usually globose, 4-seeded or (by suppression) 1-3-seeded; usually dividing into 2 bilocular or into 4 unilocular, often compressed pyrenes. *Seeds* straight, with little albumen and thin testa.—DISTRIB. About 55 species, all tropical, chiefly in the Old World.

Leaves ovate to elliptic-oblong, shortly acuminate, with about 5 pairs of main-nerves	..	..	..	..	1. <i>E. laevis</i> .
Leaves obovate or obovate-elliptic, obtuse retuse or sub-acute, with 7 or 8 pairs of main-nerves	..	..	..	..	2. <i>E. parallela</i> .

1. *EHRETIA LAEVIS*, Roxb. Cor. Pl. I. 42, t. 55; var. *timorensis*, Clarke in Hook. fil. Fl. Br. Ind. IV. 142 (1883). A small tree; young branches rusty-puberulous, becoming ultimately glabrous, dark coloured when dry. *Leaves* thinly coriaceous; ovate to elliptic-oblong, shortly acuminate, the base slightly cuneate or sometimes rounded; both surfaces glabrous, brown when dry, the lower paler and reticulate; main-nerves about 5 pairs, rather straight, ascending slightly, thin but prominent on the lower surface like the midrib; length 2.5 to 5 in., breadth 1.25 to 2.25 in.; petioles about .4 in. *Cymes* axillary and terminal, shorter than the leaves, corymbose, puberulous; the ultimate branches scorpioid. *Flowers* small, numerous, sessile. *Calyx* less than .1 in. long, its mouth with 5 oblong lobes. *Corolla-tube* .1 in. long; the lobes 5, shorter and spreading. *Anthers* exserted. *Fruit* when 4-seeded about 2 in. in diam., smaller when 2-seeded, depressed-globose, ribbed; pyrenes 4 or 2, sometimes only 1, each with a single seed; the persistent calyx much shorter than the fruit, its lobes acuminate. *E. timorensis*, Dene. in Nouv. Ann. Mus. d'Hist. Nat. III. 395; DC. Prod. IX. 505. *E. philippinensis*, DC. l.c. 504. *E. laevis*, Benth. Fl. Austral. IV. 389.

MALACCA: Maingay (K.D.) 1164; Ridley 3302. PERAK: Scortechini

167, 898; *King's Collector* 7436, 8344.—DISTRIB. Burma, *Griffith* (K.D.) 6002, Malay Archipelago, Australia.

2. *EHRETIA PARALLELA*, Clarke in Hook. fil. Fl. Br. Ind. IV. 143 (1883). A shrub, all parts except the inflorescence glabrous; young branches thinner than a goose-quill, pale when dry. *Leaves* membranous; obovate or obovate-elliptic, obtuse, from retuse to sub-acute, cuneate at the base; both surfaces dark brown when dry; main-nerves 7 or 8 pairs, scarcely curved, ascending, parallel, very bold and distinct on the lower surface like the midrib (when dry), faint on the upper; length 1.5 to 1.75 in., breadth .75 to 1 in.; petiole .25 in. Inflorescence, flowers, and fruit as in *E. laevis*, Roxb., var. *timorensis*, but smaller.

PENANG: *Curtis* 1572.—DISTRIB. Burma, *Griffith* (K.D.) 6004.

### 5. *COLDENIA*, Linn.

Much-branched, diffuse or prostrate scabrous herbs. *Leaves* alternate, crisped. *Flowers* small, axillary, sessile or sub-sessile; the upper sometimes in a short one-sided bracteate cyme. *Calyx* 4-5-partite. *Corolla* with short funnel-shaped tube and 4 or 5 spreading segments imbricate in bud. *Stamens* 4 or 5, inserted on the tube; anthers ovate. *Ovary* broadly ovoid, 2-celled, with 2 ovules in each cell, or imperfectly 4-celled with 1 in each; styles 2, distinct at the base but united upwards (although easily separable); stigmas 2, capitate. *Fruit* almost dry, composed of 4 sub-connate 1-seeded pyrenes; seeds with thin testa and little if any albumen; the cotyledons plane.—DISTRIB. Species 12, 10 of which are American, 1 African, and the undernoted which is cosmopolitan.

*COLDENIA PROCUMBENS*, Linn. Sp. Pl. 125 (1753). A scabrous-hairy prostrate herb. *Leaves* elliptic-obovate, coarsely and deeply serrate, almost pinnatifid. *Fruit*, prior to disintegration into its component pyrenes, pyramidal. Gaertn. Fruct. I. 329, t. 68; Lamk III. t. 69; Roxb. Fl. Ind. I. 448; Wall. Cat. 942; DC. Prod. IX. 558; Miq. Fl. Ind. Bat. II. 933; Clarke in Hook. fil. Fl. Br. Ind. IV. 144; Trimen Fl. Ceyl. III. 197; Cooke Bomb. Fl. II. 205; Prain Beng. Plants 718. *Lobophyllum tetrandrum*, F. Muell. in Hook. Kew Journ. Bot. IX. 21. *Waltheria microphylla*, Miq. in Pl. Hohenack. n. 87b (not of Cav.).

By waysides, not common.—DISTRIB. Everywhere in the tropics.

## Order LXXXI. CONVULVULACEÆ.

[By D. PRAIN.]

Herbs or shrubs, usually twining, occasionally erect; very rarely trees; sometimes parasitic. *Leaves* alternate or in parasitic species.



obsolete; stipules 0. *Flowers* in cymes, rarely solitary, regular, hermaphrodite; bracts at cyme-bases or under solitary flowers opposite; bracteoles at base of pedicels small, scale-like. *Sepals* 5, imbricate, occasionally slightly connate below, often persistent, sometimes accrescent. *Corolla* campanulate or infundibuliform, rarely sub-rotate; limb with 5 short or long lobes often plicate in bud, after flowering either involute or reverting to the original aestivation. *Stamens* 5, adnate to corolla-tube; anthers oblong, opening by longitudinal introrse or lateral slits. *Carpels* usually 2, very rarely 3 or more; connate throughout in a superior ovary with its base often encircled by an annular or lobed disk, and its cells as many or, by development of accessory partitions, twice as many as the component carpels, rarely, from absorption of dissepiments, fewer than carpels; ovules 2 in each carpel, sessile erect anatropous; style solitary or rarely styles 2; stigma capitate or 2-lobed or 2-fid. *Fruit* an indehiscent often dry berry, or a 2-4-valved or circumscissile or irregularly opening capsule. *Seeds* 4 to 2, rarely solitary, erect; albumen scanty or 0; cotyledons generally plicate, rarely flat.—**DISTRIB.** Species about 1,000, in all regions, but more abundant in sub-tropical and tropical countries.

Corolla-tube usually uniformly enlarged from base to apex, the 5 bands or lobes rarely, except in *Erycibe*, clearly defined from the intervening spaces; pollen not spinulose:—

Yellow parasitic twining leafless herbs .. .. 1. CUSCUTA.

Green non-parasitic leafy herbs, shrubs or trees:—

Fruit indehiscent, woody or fleshy, rather large; style short or 0; stigma 5-10-rayed; corolla-lobes 2-fid, the lobules induplicate, contorted; woody, climbing shrubs or erect trees .. 2. ERYCIBE.

Fruit dehiscent, or if indehiscent small, with thin fragile walls:—

Flowers in racemes or panicles —

Bracts not enlarged in fruit; outer 3 or all of the sepals enlarged in fruit; style entire or shortly 2-lobed; capsule indehiscent or rarely 2-valved .. .. 3. PORANA.

Bracts in fruit much enlarged, scarious, adnate to calyx; sepals not enlarged; capsule 4-valved, 1-seeded .. 4. NEUROPELTIS.

Flowers in cymes or solitary; capsule valvate or opercular, rarely dehiscing irregularly:—

Styles 2, free or partially united below; sepals not or slightly enlarging in fruit:—

Capsule 4-valved, 2-1-locular, 4-2-seeded; styles quite free, each 2-branched; cymes few-flowered .. 5. EVOLVULUS.

Capsule irregularly dehiscent, splitting into numerous vertical segments; styles usually partially united below, stigmas capitate; cymes sub-capitate .. 6. BONANIA.

Style entire, stigmas usually 2:—

Ovary 1-locular; capsule 4-valved, 4-seeded; stigmas shortly oblong; calyx-lobes not enlarged in fruit:—

- Bract enveloping the calyx; pollen spherical .. 7. CALYSTEGIA.  
 Bract not enveloping the calyx; pollen polyhedral .. 8. HEWITTIA.  
 Ovary 2-locular, sometimes 4-locular:—  
 Outer 3 sepals much larger than the 2 inner, and  
 decurrent on the peduncle; stigmas capitate .. 9. ANISEIA.  
 Outer 3 sepals not larger than the 2 inner, and not  
 decurrent on the peduncle:—  
 Stigmas elliptic; capsule 8-valved, rarely 4-valved 10. JACQUEMONTIA.  
 Stigmas globose:—  
 Capsule 4-valved; fruiting sepals not enlarged;  
 bands of corolla usually with 5 purple lines;  
 stems not winged .. .. 11. MERREMIA.  
 Capsule with circumscissile dehiscence; fruiting  
 sepals considerably enlarged; bands of corolla  
 without lines; stems winged .. .. 12. OPERCULINA.  
 Corolla-tube not uniformly enlarged from base to apex, the  
 5 bands on the lobes clearly defined by 2 prominent lines; pollen  
 spinulose:—  
 Fruit dehiscent, or if indehiscent then with thin fragile walls:—  
 Stamens arising from the backs of 5 scales attached to  
 the corolla-tube; flowers small urceolate, fasciculate; fruit  
 4-valved .. .. 13. LEPISTEMON.  
 Stamens arising directly from the corolla-tube:—  
 Corolla more or less campanulate; calyx-lobes never  
 aristate, inflorescence never scorpioid; stamens not ex-  
 serted .. .. 14. IPOMOEIA.  
 Corolla more or less hypocrateriform; calyx-lobes aristate,  
 or if obtuse the inflorescence scorpioid; stamens exserted:—  
 Flowers rather small, pink or red, slightly irregular .. 15. QUAMOCUIT.  
 Flowers large white, regular .. .. 16. CALONYCTION.  
 Fruit indehiscent, coriaceous or fleshy:—  
 Ovary 4-celled .. .. 17. ARGYREIA.  
 Ovary 2-celled .. .. 18. LETTSONIA.

## 1. CUSCUTA, Linn.

Leafless twining yellow-reddish parasitic herbs. *Flowers* small, white or rose-coloured, fascicled, sessile or shortly pedicelled; bracts small or 0. *Sepals* 5 or 4, sub-equal; free or shortly connate at the base. *Corolla* ovoid or campanulate, usually with a ring of fimbriate or lobed scales near the base or below the stamens; lobes short, imbricate. *Stamens* 5 or 4, adnate near throat of corolla; filaments short, linear; anthers oblong, partially exserted. *Ovary* more or less completely 2-celled; ovules 4; styles 2 or 1; stigmas 2. *Fruit* a globose or ovoid, dry or succulent, circumscissile or irregularly bursting 4-2-seeded capsule. *Seeds* glabrous; albumen fleshy; embryo slender, spiral; cotyledons minute or obsolete.—*DISTRIB.* Species about 80, in temperate and tropical regions.

CUSCUTA HYGROPHILÆ, H. H. W. Pears. in Hook. Ic. Plant. t. 2704.

A small slender parasitic twiner. *Flowers* in dense umbellate cymes, .25 in. wide. *Sepals* ovate obtuse, connate below, .1 in. long. *Corolla* .15 in. wide, campanulate; lobes ovate obtuse. *Stamens* 5, shortly exerted. *Scales* near base of corolla-tube shortly fimbriate. *Ovary* obtuse, more or less perfectly 2-celled; ovules 4; styles 2; stigmas capitate. *Fruit* an oblate capsule, .15 in. wide.

JOHORE: near the town, parasitic on *Hygrophila quadrivalvis*, Ridley 9161!

Closely related to *C. chinensis*, from which it differs in having the sepals without keels, and of which the writer believes it to be a form.

## 2. ERYCIBE, Roxb.

Shrubs, scandent or diffuse, less often erect; rarely trees. *Leaves* alternate, elliptic, entire, coriaceous. *Flowers* rather small; cymes in axillary or terminal panicles or racemes; bracts lanceolate, small. *Sepals* 5, small, sub-equal, orbicular, coriaceous, adpressed to base of fruit. *Corolla* rather small, white or yellowish, sub-rotate; tube hirsute externally; limb 5-lobed, the lobes obcordate, induplicate-contorted in bud, with a thicker triangular centre externally hirsute, and sub-membranous semicordate margins glabrous on both sides. *Stamens* 5, sub-included, adnate to throat of corolla; filaments short; anthers ovate-lanceolate. *Ovary* globose, 1-celled; ovules 4; stigma large, sessile, sub-globose or conic, 5- or 10-ridged. *Fruit* a fleshy, leathery or woody berry, ovoid or ellipsoid. *Seed* solitary, glabrous; albumen scanty, intruded between folds of fleshy cotyledons.—DISTRIB. Species about 30; throughout S.E. Asia.

Leaves more or less pubescent beneath:—

Pubescence on under surfaces of leaves persistent:—

Branches angular; bark fissured; pubescence on under side of leaves black, closely adpressed; leaves with acuminate tips, the lateral nerves in 5 pairs, obliquely ascending, hardly visible above . . . . . 1. *E. strigosus*.

Branches cylindric; bark not fissured: pubescence on under surface of leaves not adpressed, brown or tawny; leaves obtuse, the lateral nerves in 12 to 15 pairs, spreading not very oblique; fruit velvety . . . . . 2. *E. magnifica*.

Pubescence on under surface of leaves usually disappearing, except from the midrib, as the leaves become old; branches with fissured bark:—

Flowers in pyramidal terminal panicles, the panicle branches subtended by foliaceous bracts . . . . . 3. *E. expansa*.

Flowers in axillary cymes, or if passing into a terminal panicle the panicle branches not subtended by foliaceous bracts:—

- Flowers often passing into a terminal panicle; corolla greenish; fruit ellipsoid, black, .6 in. long, .35 in. wide .. 4. *E. Princei*.
- Flowers all axillary; corolla white; fruit ellipsoid, purple, with a faint apical areola, .75 in. long, .5 in. wide .. 5. *E. malaccensis*.
- Leaves quite glabrous on both surfaces:—
- Flowers in both terminal and axillary panicles; leaves with lateral nerves distinct, but secondary venation indistinct .. 6. *E. angulata*.
- Flowers always axillary:—
- Leaves small, never exceeding 1.75 in. long, sub-bifarious; flowers solitary, axillary .. .. 7. *E. leucoxyloides*.
- Leaves medium to large, very rarely, and never all, less than 2 in. long, arranged spirally; flowers never solitary:—
- Lateral nerves of leaves distinct and secondary reticulate venation distinct on both surfaces, or at least beneath:—
- Lateral nerves of leaves 7 to 9 pairs .. .. 8. *E. festiva*.
- Lateral nerves of leaves 6 or fewer pairs:—
- Fruit quite glabrous .. .. 9. *E. sapotacea*.
- Fruit finely velvety .. .. 10. *E. Stappiana*.
- Lateral nerves of leaves indistinct, secondary venation not visible:—
- Corolla rufous-pubescent internally as well as externally .. .. 11. *E. præcipua*.
- Corolla glabrous internally:—
- Flowers densely glomerate in leaf axils; leaves pale waxy greenish-yellow beneath .. .. 12. *E. glomerata*.
- Flowers in short but open axillary cymes:—
- Leaves thickly coriaceous; fruit verrucose but not scurfy externally .. .. 13. *E. aenea*.
- Leaves sub-coriaceous; fruit scurfy but not verrucose externally .. .. 14. *E. Griffithii*.

1. *ERYCIBE STRIGOSA*, Prain Journ. As. Soc. Beng. LXV. 2. 536. A climber 40 to 60 feet long, with stems 1 to 2 in. in diam.; branches slightly angled with fissured bark, and except along the fissures densely clothed with black adpressed tomentum; branchlets angular with black adpressed tomentum. *Leaves* elliptic or ovate-lanceolate, base cuneate, apex rather long acuminate, with tip obtuse; 3 to 4 in. long, 1.5 to 1.75 in. wide; thinly coriaceous; dark green, quite glabrous above, brownish-black and densely covered with black adpressed tomentum beneath; lateral nerves 5 pairs, oblique, distinct beneath not visible above, secondary venation indistinct beneath not visible above; petiole .75 to 1 in. long, with close adpressed black tomentum. *Flowers* in few-flowered cymes, .25 in. across, disposed in narrow axillary panicles 3 to 6 in. long, .5 in. wide; main-rachis angular, densely rusty-pubescent, the peduncles of individual cymes .25 in. long or less, densely rusty-pubescent, as are the linear deciduous bracteoles .15 in. long, and the very short pedicels. *Sepals* orbicular, rusty-pubescent. *Corolla* white, .3 in. across (but not quite fully opened), the lobes spreading, glabrous



within; interlobular spaces brown tomentose externally; lobules ovate, their margins sub-entire. Hallier f. Bull. Herb. Boiss. V. 737.

PERAK: Thaipeng, 500 to 800 feet elevation; *King's Collector* 8461!

2. *ERYCIBE MAGNIFICA*, Prain Journ. As. Soc. Beng. LXXIII.

2. 18. A strong creeper 80 to 100 feet long, stem 2 to 3 in. in diam.; old branches .75 in. in diam. still densely tomentose, quite cylindric, with large pith; branchlets .3 in. in diam., densely velvety with a tawny to rusty matted tomentum. *Leaves* elliptic or elliptic-obovate, with a narrowly truncate or rounded base, and an obtuse or sometimes retuse apex, the margin strongly revolute; 8 to 10 in. long, 3.5 to 4 in. wide; coriaceous; upper surface quite glabrous, dark green and shining with sometimes a silvery, sometimes a rich coppery sheen; under surface velvety, pale brownish-green, the tomentum longer, looser, and sometimes whitish on the main-nerves; lateral nerves rather straight, spreading, 12 to 15 pairs, rather distinctly looped along the margin, prominent beneath, deeply impressed above, as is the secondary reticulate venation; petiole .35 in. long, densely rusty-velvety. *Flowers* in short axillary racemes, sometimes clustered, of close-set 2-3-flowered individual cymules; the racemes 1 to 2 in. long; peduncles, short pedicels and small ovate bracts and bracteoles densely rusty-velvety. *Sepals* orbicular, densely velvety outside, quite glabrous within, coriaceous, in fruit .2 in. across. *Corolla* .5 in. across; lobes slightly spreading, glabrous within, and waxy white or yellow, narrow and deeply divided; interlobular spaces densely dark brown, almost black velvety-pubescent externally; lobules very small oblong. *Fruit* ellipsoid, 1.25 in. long, 1 in. in diam., densely softly velvety, of a rich brown colour.

PERAK: *King's Collector* 3454! 3879! 6721!

In the first of his three gatherings Kunstler has noted this as a tree 50 to 70 feet high, but in the two subsequent ones as a large creeper, which is, from the appearance of the specimens, undoubtedly the case with the first gathering also.

3. *ERYCIBE EXPANSA*, Wall. Cat. 1331. A large climber, branches angled, with fissured bark, glabrous; branchlets angular, densely rusty-tomentose. *Leaves* elliptic or slightly obovate, apex abruptly shortly acuminate to a sharp tip, base rounded or sub-cordate; 2 to 2.5 in. long, 1 to 1.5 in. wide; chartaceous; dark green, quite glabrous above, paler and rusty-pubescent, especially on the nerves, beneath, the pubescence ultimately disappearing except from the nerves in old leaves; lateral nerves 2 to 3 pairs, very oblique, ascending; secondary reticulate venation fairly visible above only; petioles .15 in. long, densely rusty-pubescent. *Flowers* in rather condensed 5-9-flowered cymes disposed in pyra-

midal terminal panicles 3 to 15 in. long, 1.5 to 6 in. wide, the main rachis and branches densely rusty-tomentose, the panicle branches .75 to 2.5 in. long, subtended by large foliaceous bracts .4 to 1 in. long, exactly like the foliage leaves but smaller; peduncles of individual cymes rusty-tomentose, .25 in. long; pedicels bracteolate, .1 in. long or less, rusty-tomentose. *Sepals* orbicular, rusty-pubescent. *Corolla* white, or white tinged with pink, .45 in. wide; lobes spreading, glabrous within; interlobular spaces densely rusty-pubescent externally; lobules ovate acute, their margins sub-entire. G. Don Gen. Syst. IV. 392; Clarke in Hook. f. Flor. Brit. Ind. IV. 181; Prain Journ. As. Soc. Beng. LXIII. 2. 84; Hallier f. Bull. Herb. Boiss. V. 737. *E. ferruginosa*, Griff. Notul. IV. 283. *E. paniculata*,  $\beta$ . *expansa*, Choisy Ann. Sc. Nat. 2. I. 222; DC. Prod. IX. 464. *E. coriacea*, Kurz For. Flor. Burm. II. 213 partly (not of Wall.).

KEDAH: Lankawi, Curtis 2128!—DISTRIB. Tenasserim.

4. *ERYCIBE* PRINCEI, Wall. Cat. 1335. A large straggling bush with spreading branches, or a stout climber; branches glabrous, the bark more or less fissured but quite cylindric; branchlets densely rusty-tomentose, cylindric. *Leaves* obovate-oblong or rarely obovate-lanceolate, narrowed slightly to the narrowly truncate or sometimes rounded base, more abruptly to the shortly acuminate or acute apex, with an obtuse or occasionally acute tip; 2.5 to 4 in. long, 1.25 to 1.75 in. wide; coriaceous, shrinking somewhat irregularly when dry; glabrous rather pale green above, beneath at first rusty pubescent with a loose tomentum, which soon disappears except from the midrib; lateral nerves 5 to 7 pairs, very oblique and not very prominent on either surface, with a distinct sub-marginal looping vein; secondary reticulate venation distinct but not prominent on either surface; petiole .2 to .25 in. long, rusty-pubescent. *Flowers* in axillary cymes in the uppermost leaf axils, 5-9-flowered, .75 in. wide, the ultimate 3 to 7 passing into a terminal panicle without leaves 1.5 to 3 in. long, rarely longer; peduncles .15 to .25 in. long, rusty-pubescent; pedicels very short and lanceolate bracteoles, .2 in. long, rusty-pubescent. *Sepals* orbicular, coriaceous, rusty-pubescent. *Corolla* greenish, sweet-scented, .4 in. across; lobes slightly spreading; interlobular spaces shining golden silky externally; lobules ovate, margins finely undulate. *Fruit* ellipsoid, black, smooth, .6 in. long, .35 in. in diam. Choisy in Ann. Sc. Nat. 2. I. 224; DC. Prod. IX. 464; Clarke in Hook. f. Flor. Brit. Ind. IV. 152; Prain Journ. As. Soc. Beng. LXIII. 2. 85; Hallier f. Bull. Herb. Boiss. V. 737 (excluding the Assam and Khasia localities), 1052. *E. campybotrya*, Miq. Flor. Ind. Bat. Suppl. 578.

MALACCA: Griffith 5883 (K.D.)! Maingay 1155 (K.D.)! SINGA-

PORE: in hedges, frequent, *Kurz* 2968! *Hullett* 628! 642!—DISTRIB. Bangka, Sumatra, Borneo.

5. *ERYCIBE MALACCENSIS*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A stout spreading shrub with straggling branches, or a climber extending to 100 feet in length; branches glabrous, with fissured bark, but cylindric; branchlets stellately puberulous, rather distinctly angled. *Leaves* elliptic, oblong or obovate-oblong, narrowed from the middle or beyond to the cuneate or narrowly truncate base and more abruptly to the shortly acuminate apex with obtuse tip; 3 to 3.5 in. long, 1.25 to 1.5 in. wide; thickly chartaceous; dark green, shining, quite glabrous above; paler glaucescent beneath and at first pubescent with a deciduous tomentum which soon disappears except from the rusty midrib; lateral nerves 5 to 6 pairs, usually very oblique, rather distinct on both surfaces as is the secondary reticulate venation; petiole .25 in. long, rusty-tomentose. *Flowers* in axillary 5-9-flowered cymes, .5 in. wide; peduncles .2 to 1.5 in. long, rusty-tomentose; bracteoles elliptic, fulvous-tomentose, small; pedicels .15 in. long, rusty. *Sepals* orbicular, fulvous-tomentose. *Corolla* glabrous within, white, .35 in. across; lobes slightly spreading; interlobular spaces fulvous-tomentose externally; lobules ovate, margins slightly undulate. *Fruit* ellipsoid, purple, .75 in. long, .5 in. in diam. with a faint apical areola, glabrous. *Prain Journ. As. Soc. Beng.* LXIII. 2. 85; *Hallier f. Bull. Herb. Boiss.* V. 738.

PERAK: Larut, *King's Collector* 3093! 3180! 3575! *Scortechini* 2196! Kota, *Wray* 2412! PENANG: *Maingay* 1154! MALACCA: Bukit Labukor, *Ridley* 3526! Batu Tiga, *Derry* 1042!—DISTRIB. Tenasserim.

6. *ERYCIBE ANGULATA*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 84. A robust scandent shrub or a strong climber; stems sometimes over 100 feet long and 4 to 6 in. in diam.; branches terete, glabrous; ultimate branchlets angular, rusty-pubescent. *Leaves* obovate, base cuneate or rounded, apex shortly acuminate or rounded or sometimes deeply emarginate (normally shortly acuminate); 4 to 8 in. long, 2 to 4 in. wide; coriaceous, quite glabrous; lateral nerves 5 to 8 pairs, visible above, distinctly raised beneath; secondary venation indistinct; petioles .5 in. long, rusty-pubescent. *Flowers* in few-flowered cymes disposed in axillary and terminal panicles with angular rachis clothed with dark-red tomentum; axillary inflorescences 1 to 6 in. long, 1 to 1.5 in. wide, terminal 7 to 10 in. long, with sometimes floral leaves intermixed; pedicels bracteolate, .25 to .5 in. long. *Sepals* orbicular, outer stellately rusty-tomentose, inner ciliate. *Corolla* white, .5 in. wide; lobes spreading; interlobular spaces hirsute externally; lobules glabrous, ovate-oblong, with slightly undulate margins. *Hallier f. Bull. Herb.*

Boiss. V. 739. *E. paniculata*, Miq. Flor. Ind. Bat. Suppl. 248 (not of Roxb.).

PERAK: Larut, King's Collector 7379! Dijong, Scortechini 1816!—  
DISTRIB. Sumatra (Teysmann 3682).

When originally describing this species the writer referred to it a Java specimen collected by Kurz; Dr. Hallier, however, whose knowledge of *Convolvulaceæ* is so profound, has shown that this Java specimen, which is not a very good one, belongs in reality to a distinct species—*E. macrophylla*, Hallier f.

7. *ERYCIBE LEUCOXYLOIDES*, King MSS. ex Ridl. in Herb. Singap.; Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A very large climber with slender cylindric branches, bark fissured and covered with a close grey pubescence; branchlets numerous, very slender, rather distinctly angled, grey- or rusty-pubescent. *Leaves* sub-bifarious, ovate or ovate-lanceolate, base rounded, apex sub-acuminate or abruptly narrowed to an obtuse tip; 1 to 1.75 in. long, .4 to .6 in. wide; membranous or thinly chartaceous; quite glabrous on both surfaces; rather dark green above, paler beneath; secondary nerves about 3 pairs, very oblique and hardly visible above except in young leaves, not visible beneath even when dry and even when young; petiole .1 in. long, grey-pubescent. *Flowers* axillary, solitary; pedicels .2 in. long, somewhat recurved in fruit, grey-pubescent, bracteolate under the calyx. *Sepals* orbicular, sparsely pubescent on the centre externally, elsewhere glabrous except the ciliate margins. *Corolla* white, sweet-scented, .5 in. across; interlobular spaces brown-tomentose externally; lobules broad, semi-orbicular, entire. *Fruit* elliptic, black, smooth, glabrous, .6 in. long, .4 in. wide.

SINGAPORE: climbing in secondary jungle, Hallier! Ridley 2051, 6897! 10927! SELANGOR: Kwala Lumpar, Curtis 2402! JOHORE: Ridley!

8. *ERYCIBE FESTIVA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A climber, 60 to 70 feet long (Kunstler), or a small tree (Hullett); branches grooved but cylindric; ultimate branchlets slightly angular, sparingly pubescent. *Leaves* elliptic or oblong, base cuneate, apex usually rather long acuminate with an obtuse tip; 3 to 6 in. long, 1.5 to 2.5 in. wide; glabrous; thinly coriaceous; lateral nerves 7 to 9 pairs, distinct on both surfaces, especially beneath, secondary venation distinct beneath; petiole glabrous, .5 to .75 in. long. *Flowers* in short axillary 7-12-flowered cymes .5 to .75 in. across; peduncles .3 to .5 in. long, rusty-pubescent; pedicels rusty-pubescent, bracteolate, .12 in. long. *Sepals* orbicular, rusty-pubescent. *Corolla* pale greenish-white within, .75 in. across, lobes broad; interlobular spaces brown-tomentose externally; lobules ovate, margins erose, usually rather deeply, through-



out. Prain Journ. As. Soc. Beng. LXV. 2. 536; Hallier f. Bull. Herb. Boiss. V. 739.

PERAK: in open forest in rocky localities, at 500 to 800 feet elevation, *King's Collector* 6445! SINGAPORE: garden jungle, *Ridley* 6043! *Hullett*!

9. *ERYCIBE SAPOTACEA*, Hallier f. & Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A tree (?); branches slightly angled, with fissured bark, quite glabrous. *Leaves* elliptic, base cuneate, apex abruptly shortly acuminate with tip obtuse; 5 in. long, 2 to 2.25 in. wide; firmly coriaceous; quite glabrous on both sides; bright green and glossy above, pale beneath; lateral nerves 6 pairs, distinct above and rather prominent beneath, secondary reticulate venation very distinct on both surfaces; petiole .5 in. long, glabrous. *Flowers* in few-flowered congested, axillary subsessile cymes. *Sepals* and *Corolla* not seen. *Fruit* ovoid, quite glabrous, the epicarp very coriaceous, almost woody, wrinkled and fissured, with a rounded base and conical pointed apex, 2 in. long, 1 in. in diam.; fruiting pedicels .3 in. long, with epidermis fissured like that on the branches.

PENANG: Government Hill, *Curtis* 772!

A very distinct and striking species, the flowers of which are as yet unknown. In shape the fruit is most like that of *E. Griffithii*, but besides being about twice the size it has none of the scurfy covering of the fruit of that species. The leaves of the two are very different.

10. *ERYCIBE STAFFIANA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A shrubby or slender climber, sometimes 80 to 100 feet long; much branched; branches and glabrous branchlets cylindric. *Leaves* usually oblong or elliptic, rarely narrowly lanceolate, narrowed to a cuneate or narrowly truncate base, apex shortly acuminate with a blunt tip; 4 to 7 in. long, 2 to 3 in. wide; coriaceous; glabrous; dark green and glossy above, paler beneath; lateral nerves 4 to 6 pairs, ascending obliquely, the lowest pairs extending more than half-way along the margin, the secondary veins reticulately raised beneath, visible but not conspicuous above; petiole .25 in. long, glabrous. *Flowers* in clustered axillary cymes .5 to 2 in. long, in fascicles of 4 to 9 from a woody protuberance, each 5-20-flowered; peduncles densely dark-brown-tomentose, as are the bracteolate pedicels, .1 to .15 in. long. *Sepals* orbicular, densely brown-tomentose. *Corolla* waxy-white within, .5 in. across; lobes narrow; interlobular spaces very dark-brown-tomentose (nearly black—*Kunstler*) externally; lobules narrow, divergent, slightly crenulate along the obliquely truncate apex. *Fruit* ovoid, .6 to .8 in. long, .5 in. in diam., densely clothed with a fine dark-brown velvety tomentum. Hallier f. Bull. Herb. Boiss. V. 738.

PERAK: at various elevations from 300 to 4,000 feet, *King's Collector* 4015! 4115! 7784! *Wray* 3371! *Scortechini* 1793!—DISTRIB. Tenasserim (*Parish*).

11. *ERYCIBE PRÆCIPUA*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 86. A large climbing shrub; branches and ultimate branchlets cylindric, glabrous. *Leaves* narrowly elliptic to elliptic, narrowed to the cuneate base and more abruptly to the obtuse tip; thickly coriaceous; quite glabrous; 1.5 to 4 in. long, .75 to 2 in. wide; nerves about 5 pairs, curved and ascending, but all very obscure even when dry; petioles .3 in. long, glabrous. *Flowers* in small, axillary, laxly 5-8-flowered cymes .5 in. across; peduncles and bracteolate pedicels closely rusty-pubescent, pedicels .12 in. long. *Sepals* orbicular, the outer minutely, the inner densely closely rusty-pubescent. *Corolla* whitish, .5 in. wide, the lobes very narrow, spreading; interlobular spaces rufous-pubescent internally as well as externally; lobules small glabrous, narrowly oblong, sub-acute, divergent. *Fruit* ovoid, slightly rough but not verrucose, .7 to .75 in. long, .5 to .6 in. wide, pointed or rounded.

PENANG: Government Hill, *Curtis* 911! 1273! PERAK: Larut, *Scortechini*!

Father *Scortechini*'s specimens from Perak have the fruit slightly smaller, not at all pointed, and not so distinctly roughened as the Penang specimens, but in all other respects the two plants agree.

12. *ERYCIBE GLOMERATA*, *Bl. Bijdr.* 1047. A shrub or a small tree, 10 to 20 feet high, erect, much spreading; branches and sparingly pubescent ultimate branchlets cylindric. *Leaves* elliptic or narrow-oblong, shortly or gradually narrowed to the cuneate base and to the obtuse tip; 7 to 12 in. long, 1.75 to 5 in. wide; coriaceous; quite glabrous; dark green above, waxy-pale greenish-yellow (*Kunstler*) beneath; lateral nerves 8 to 9 pairs, visible but not raised on either surface or only faintly raised beneath; petiole .15 to .35 in. long. *Flowers* in axillary very short and closely glomerate 5-8-flowered cymes; peduncles .05 in. long; individual flowers nearly sessile with 3 rusty-pubescent bracteoles at the base of the calyx. *Sepals* almost glabrous, pale waxy-green (*Kunstler*), orbicular, margins ciliate. *Corolla* pure white within, 1.25 in. across; lobes narrow; interlobular spaces rufous externally; lobules oblong, obtuse, slightly crenulate at the apex. *Hallier f. Bull. Herb. Boiss.* V. 382, 739. *E. albida*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 87.

*VAR. typica*; *leaves* elliptic, 3.5 to 5 in. wide.

PERAK: on Gunung Bubu, 2,500 to 3,000 feet, *King's Collector* 7373! Larut, *Scortechini*! PUNGAH: *Curtis* 2947!—DISTRIB. JAYA.

VAR. *longifolia*, Bl. Bijdr. 1047; leaves cuneate-oblong, obtusely acuminate, 1·75 to 2·25 in. wide. *E. angustifolia*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Waterfall Hill, Wray 2580! MALACCA: Bujong, Scortechini 1908!—DISTRIB. Java, Borneo.

13. *ERYCIBE AENEA*, Prain Journ. As. Soc. Beng. LXIII. 2. 85. A very large climber; stems 70 to 150 feet long, 3 to 4 in. in diam.; branches and densely rusty-tomentose branchlets cylindric. Leaves narrowly oblong or elliptic, base cuneate, apex gradually or oftener abruptly narrowed to an obtuse tip; thickly coriaceous; quite glabrous; 2·5 to 5 in. long, 1 to 2 in. wide; lateral nerves 5 to 6 pairs with a distinct sub-marginal connecting nerve, impressed on both surfaces but especially beneath; petiole ·25 in. or less. Flowers in axillary 3–20-flowered cymes ·25 to 1·2 in. long; peduncles and bracteolate pedicels minutely closely rusty-tomentose; pedicels ·12 in. long. Sepals orbicular, closely brown-tomentose. Corolla pale yellow, ·5 in. across, the lobes spreading; interlobular spaces pale brown-tomentose externally; lobules ovate-oblong, their margins undulate. Fruit elliptic, verrucose, grey, ·9 in. long, ·5 to ·6 in. wide. Hallier f. Bull. Hort. Boiss. V. 739.

PERAK: Larut, at elevations of from 300 to 2,500 feet, King's Collector 7337! 8165!

14. *ERYCIBE GRIFFITHII*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A climber 60 to 80 feet long; stem 4 to 6 in. in diam.; branches cylindric, glabrous; branchlets cylindric, sparingly rusty-pubescent. Leaves elliptic, rarely ovate-lanceolate or obovate-oblong, base cuneate or rarely rounded, apex usually abruptly acuminate, less often gradually narrowed to the obtuse tip; 2·75 to 6 in. long, ·75 to 2·5 in. wide; quite glabrous on both surfaces, sub-coriaceous; lateral nerves 6 to 8 pairs, very oblique, visible but not prominent above, prominent beneath; secondary venation very indistinct; petiole ·25 to ·3 in. long, glabrous. Flowers in short axillary solitary or clustered 4–9-flowered cymes ·3 in. across; peduncles rusty-pubescent, ·2 to ·3 in. long; pedicels ·25 in. long, rusty-pubescent as are the very minute ovate-lanceolate bracteoles. Sepals orbicular, rusty-pubescent externally. Corolla waxy cream-coloured and glabrous within, ·5 in. across, the lobes spreading, narrow and stellate; interlobular spaces rusty-brown externally; lobules narrow acute, their margins sub-entire. Fruit coriaceous, greyish-brown and closely scurfy externally, 1 to 1·5 in. long, ·5 to ·75 in. wide. Prain Journ. As. Soc. Beng. LXIII. 85; Hallier f. Verslag. Buitenzorg, 1895. 126; Bull. Herb. Boiss. V. 738, 1052. *E. Maingayi*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182; Hallier f. Bull. Herb. Boiss. V. 737. *E. micrantha*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Larut, 200 to 300 feet elevation, *King's Collector* 8191! *Scortechini*! MALACCA: *Maingay*. PENANG: *Gaudichaud* 120; *Curtis* 181! *King's Collector* 1458!—DISTRIB. Tenasserim, Sumatra, Philippines.

### 3. PORANA, Burm.

Large climbers. *Leaves* petioled, ovate or cordate, entire. *Flowers* small; cymes often in large panicles; bracts persistent; bracteoles subulate or 0. *Sepals* 5, small and narrow in flower; in fruit the outer 3 or all 5 much accrescent, membranous and spreading, usually spathulate. *Corolla* white, campanulate or infundibuliform with a wide or narrow throat; limb spreading plicate, sub-entire or 5-lobed. *Stamens* 5, adnate to corolla-tube, sub-included; filaments linear or filiform. *Ovary* 2-celled or 1-celled; ovules 4 or 2; style long or short, entire or 2-fid; stigma solitary 2-lobed, or stigmas 2, capitate. *Fruit* globose oblong or obconic, 1-seeded, membranous, indehiscent or opening by 2 valves. *Seed* glabrous; cotyledons plicate.—DISTRIB. Species about 10, throughout S.E. Asia.

PORANA VOLUBILIS, Burm. Fl. Ind. 51. t. 21. f. 1. A large climber; stems and warted branches glabrous, young shoots pubescent. *Leaves* glabrous, ovate sub-cordate, or sometimes base rounded, apex shortly acuminate, quite glabrous, 2·5 in. long, 1·5 in. wide; petiole ·6 in. long. *Flowers* white, small, in sub-ebracteate cymes disposed in panicles 12 to 15 in. long, minutely tawny-pubescent; pedicels ·1 to ·25 in. long. *Sepals* 5, minutely pubescent, in flower ·2 in. long, oblong; in fruit ·35 in. long, sub-spathulate, all equal. *Corolla* ·3 in. long; tube narrow; limb rather distinctly 5-lobed. *Stamens* 5, included. *Ovary* 2-celled; ovules 4; style 2-partite; stigmas small, capitate. *Fruit* a globose capsule, enclosed in the accrescent 5–7-nerved calyx-lobes, ·15 in. in diam. *Seed* solitary. Lamk Ill. t. 186; Roxb. Fl. Ind. ed. Carey & Wall. II. 40; ed. orig. I. 465; Blume Bijdr. 723; Wall. Cat. 1327; Choisy Convolv. Or. 106, and in DC. Prod. IX. 436; Clarke in Hook. f. Flor. Brit. Ind. IV. 222.

MALACCA: *Griffith*! *King*!—DISTRIB. Indo-China, Malay Archipelago.

King's examples are from a cultivated plant; whether those of Griffith be from wild plants is unknown.

### 4. NEUROPELTIS, Wall.

Large scandent, tomentose shrubs. *Leaves* ovate or oblong, firm, petioled. *Flowers* many, small, in axillary racemes or terminal panicles; pedicels distinct, beset by solitary ovate-lanceolate bracteoles under the calyx, in flower inconspicuous, in fruit greatly accrescent.



*Sepals* 5, sub-orbicular, hardly altered in fruit. *Corolla* small, white; tube wide-campanulate; limb deeply 5-lobed, the lobes induplicate-valvate in bud. *Stamens* 5, exserted or included, adnate to corolla-tube; filaments filiform. *Ovary* imperfectly or perfectly 2-celled; ovules 4; styles 2, free throughout, stigmas sub-capitate wavy or obscurely lobed. *Fruit* a globose, 4-valved, 1-seeded capsule sessile near the centre of the flat, much-accrecent bracteole. *Seed* globose, glabrous, albuminous; cotyledons plicate.—*DISTRIB.* Species 2, in tropics of Eastern Hemisphere.

*NEUROPELTIS RACEMOSA*, Wall. Cat. 1322. A robust climber; branchlets pubescent, lenticellate, rather dark. *Leaves* alternate, elliptic-lanceolate, base cuneate, apex acuminate with a narrow longish thickened mucro; lamina 2·5 to 5 in. long, 1·25 to 2·25 in. wide; firmly papery; glabrous except along the midrib above, slightly rusty with a sub-persistent pubescence beneath; lateral nerves about 7-paired, somewhat curved forward, rather prominent and pubescent beneath. *Flowers* in axillary racemes 2 to 5 in. long, peduncle ·5 to 1 in. and rachis rusty-tomentose; bracts small ovate; pedicels ·12 to ·2 in. long, tomentose, slender, with an ovate-lanceolate bracteole under the calyx. *Sepals* 5, somewhat connate below, small, orbicular, rufous-villous. *Corolla* small, campanulate, white, tube rufous-villous externally; limb ·25 to ·3 in. across, 5-lobed, lobes ovate nearly as long as the tube. *Stamens* 5, adnate to corolla-tube, exserted; filaments thickened at base. *Ovary* imperfectly or perfectly 2-celled, rufous-villous at base; ovules 2 in each cell; styles 2, glabrous; stigmas large globose wavy. *Capsule* ·25 in. long, ovoid, glabrescent, sessile in the centre of the accrescent, orbicular, scarious, reticulate bract 1 to 1·75 in. wide with rounded or cordate base. *Seed* globose, glabrous, albuminous; cotyledons plicate. Roxb. Flor. Ind. ed. Carey & Wall. II. 44; Deless. Ic. Select. V. t. 96; Choisy Convolv. Or. 109, t. 2. f. 12, and in DC. Prod. IX. 437; Bedd. Ic. Pl. Ind. Or. t. 291; Kurz For. Flor. Burm. II. 222; Clarke in Hook f. Flor. Brit. Ind. IV. 225. *N. ovata*, Wall. Cat. 1323; Choisy Convolv. Or. 110, t. 2, f. 13, and in DC. Prod. IX. 437. *N. bracteata*, Griff. Notul. IV. 285. *N. intermedia*, Griff. Notul. IV. 285.

PERAK: Larut, *Scortechini* 1483! 1489! 2071! *King's Collector* 3544! 3792! 4370! 6809! PENANG: *Wallich*! MALACCA: *Maingay* 1152! 1153! SINGAPORE: *Wallich*!—*DISTRIB.* Malabar, Borneo.

##### 5. EVOLVULUS, Linn.

Small prostrate or erect herbs or undershrubs, never climbing. *Leaves* small, entire, often distichous. *Flowers* small, blueish or white,

in axillary few-flowered peduncled or sub-sessile cymes. *Sepals* 5, small, sub-equal, not enlarged in fruit. *Corolla* small, funnel-shaped or sub-rotate; limb plicate, sub-entire. *Stamens* 5, included or exserted; filaments filiform. *Ovary* 2-celled or, rarely, 1-celled; ovules 4; styles 2, free from the base, each cleft into 2 linear or sub-clavate stigmas, papillose on the inner face. *Fruit* a 4-valved, less often a 2-valved capsule, 2-celled or 1-celled. *Seeds* 4 or 2, rarely solitary, glabrous; cotyledons twice plicate.—**DISTRIB.** Species about 80, mostly tropical American; the present the only Asiatic.

*EVOLVULUS ALSINOIDES*, Linn. Sp. Pl. ed. II. 392. A small perennial herb; annual branches numerous, wiry, often prostrate. *Leaves* variable in shape from lanceolate to ovate, and in pubescence from sparingly silky to densely tawny or rufous-tomentose; .25 to 1 in. or occasionally 1.5 in. long, .2 to .5 in. wide; petiole absent or short, rarely .2 in. long. *Flowers* 1 to 3, on peduncles .1 in. to 1 or 1.5 in. long; bracts small, linear, hirsute, persistent; pedicels .05 to .5 in. long. *Sepals* 5, lanceolate, hirsute, .1 to .15 in. long. *Corolla* pale blue or white, transparent, .25 to .3 in. long. *Capsule* globose, .15 in. in diam., 4-valved. *Seeds* 4, glabrous. *Burm. Fl. Zeyl.* 9, t. 6, f. 1; *Wall. Cat.* 1317; *Roxb. Flor. Ind.* II. 105; *Choisy in DC. Prod.* IX. 447; *Clarke in Hook f. Flor. Brit. Ind.* IV. 220. *E. linifolius*, Linn. Sp. Pl. ed. II. 392; *Choisy in DC. Prod.* IX. 449. *E. angustifolius*, *Roxb. Flor. Ind.* ed. Carey & Wall. II. 107. *E. hirsutus*, *Lamk Encyc. Meth.* III. 538; *Ill. t.* 216, f. 2; *Choisy in DC. Prod.* IX. 447, excl. syn. *Roxb. E. sericeus*, *Wall. Cat.* 1315. *Convolvulus valerianoides*, *Blanco Fl. Filip.* 90.

**NICOBARS:** Kamorta, *Kurz!* **SINGAPORE:** Changi, *Ridley!*—**DISTRIB.** Cosmopolitan in the tropics.

The form recorded from the Nicobars and Singapore is the narrow-leaved form, which is *E. linifolius* Linn. In both localities it is probably an introduced weed.

## 6. BONAMIA, Thouars.

Large climbing shrubs. *Leaves* large ovate-cordate, entire, firm. *Flowers* medium, in axillary peduncled cymes; bracts small. *Sepals* 5, sub-equal, firm, ovate. *Corolla* infundibuliform, tube hirsute externally except opposite the sepals; limb 5-lobed, plicate. *Stamens*, 5, included, adnate to corolla-tube; filaments filiform, at least in upper part. *Ovary* 2-celled; ovules 4; style 2-fid to the middle; stigmas 2, capitate. *Fruit* a globose or ovoid capsule; valves thin, splitting irregularly at their apices. *Seeds* normally 4, glabrous or nearly so.—**DISTRIB.** Species about 30, throughout the tropics.

BONAMIA SEMIDIGYNA, Hallier f. Engl. Bot. Jahrb. XVI. 528. A large twining shrub; stems and leaves rusty-tomentose. *Leaves* ovate-cordate, entire, apex acute; length 4 in., width 2·5 in.; petiole 1·5 in. long. *Flowers* medium, in axillary sub-capitate 2-5-flowered cymes; peduncles 1 to 2 in. long, rusty-villous as are the pedicels and sepals; bracts 2·5 in. long, oblong, rusty-villous. *Sepals* 3·5 to 5 in. long, ovate-oblong, sub-acute, sub-equal. *Corolla* yellowish, wide-infundibuliform, 1·5 in. long; tube hirsute externally; limb sub-entire. *Style* 6 in. long. *Capsule* sub-globose, glabrous, 5 in. in diam., splitting into many vertical segments, hardly covered by the slightly accrescent, ovate fruiting sepals. *Seeds* sub-glabrous. Bull. Herb. Boiss. V. 1814. *Convolvulus semidigynus*, Roxb. Hort. Beng. 13; Flor. Ind. I. 468; Wall. Cat. 1405. *Breweria cordata*, Bl. Bijdr. 722; Choisy in DC. Prod. IX. 438; Clarke in Hook. f. Flor. Brit. Ind. IV. 223. *B. Roxburghii*, Choisy Convolv. Or. III., and in DC. Prod. IX. 438; Wight, Ic. t. 1370; Dalz & Gibs. Bomb. Fl. 162. *B. madagascariensis*, Choisy Mem. Soc. Phys. Genev. 493.

PROV. WELLESLEY: at Kubang Ulu, *Curtis*! PENANG: on the coast, *Porter*! *Curtis* 1703! PERAK: Ipoh, *Curtis* 3166!—DISTRIB. S.E. Asia generally, Mascarenes.

#### 7. CALYSTEGIA, R. Br.

Prostrate or twining perennial herbs. *Leaves* entire or lobed, glabrous or nearly so. *Flowers* medium, axillary solitary or rarely in few-flowered cymes; bracts 2, large, leafy, embracing the calyx, persistent. *Sepals* 5, ovate or oblong, the innermost 2 rather the smallest. *Corolla* funnel-shaped or campanulate; tube glabrous externally with 5 bands in centre of component petals, each with 5 pellucid lines at the base; limb sub-entire plicate. *Stamens* 5, adnate to corolla-tube, included; filaments sub-equal. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform, entire; stigma of 2 oblong lobes. *Fruit* a globose, 1-celled, 4-valved, 4-seeded capsule. *Seeds* black, glabrous or verrucose.—DISTRIB. Species 16 to 20, in warm and temperate regions.

CALYSTEGIA HEDERACEA Wall. Cat. 1328. A prostrate or climbing weed of cultivated places and hedges. *Leaves* somewhat irregular, cordate or sagittate, lobed or rarely entire, 1 to 3 in. long, 75 to 1 in. wide; petiole 1 in. long. *Flowers* axillary solitary; peduncles 1 in. long; bracts 2 ovate, 3 in. across, persistent, enclosing the calyx. *Sepals* 5, oblong, obtuse, glabrous, outer 3 in. long, inner rather smaller. *Corolla* sub-campanulate, pinkish purple, tube 1 in. long; limb plicate, sub-entire. *Capsule* ovoid, sub-acute, glabrous, 3 in. long.

*Seeds* glabrous. Roxb. Flor. Ind. ed. Carey & Wall. II. 94; Choisy Convolv. Or. 103, and in DC. Prod. IX. 434; Clarke in Hook. f. Flor. Brit. Ind. IV. 217. *Convolvulus Wallichianus*, Spreng. Syst. cur. post. 61.

PENANG: Porter, fide Wallich.—DISTRIB. Northern India, Afghanistan, Eastern Asia.

Possibly only a casual weed in our area.

### 8. HEWITTIA, W. & A.

A pubescent twining herb. *Leaves* cordate, entire angled or lobed. *Flowers* axillary solitary, or in few-flowered cymes; bracts below the calyx 2, linear-lanceolate. *Sepals* 5, acute; outer 3 wide-ovate, accrescent in fruit, inner 2 narrow-lanceolate. *Corolla* medium, yellow or white with a purple eye; tube campanulate; limb plicate. *Stamens* 5, included, adnate to corolla-tube; filaments linear with dilated bases. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform; stigma of 2 ovate-oblong lobes. *Fruit* a globose, 4-valved, 1-celled, normally 4-seeded capsule. *Seeds* black, glabrous.—DISTRIB. A single species, throughout the tropics of the Eastern Hemisphere and Polynesia.

HEWITTIA BICOLOR, Wight Ic. t. 835. A pubescent perennial herb; stems twining. *Leaves* cordate, entire angled or lobed, pubescent, 2 to 4 in. long; petiole .5 in. long. *Flowers* on axillary 1-few-flowered peduncles .5 to 4 in. long; bracts 2, narrow-lanceolate, .25 to .5 in. long, situated a short distance below the calyx. *Sepals* 5, the outer ovate, accrescent; the inner narrowly lanceolate, .3 to .5 in. long. *Corolla* yellow or whitish with a purple patch in lower part of tube, rather widely campanulate, 1 in. long; tube externally hirsute; lobes 5, very short. *Stamens* 5, included; filaments linear with dilated bases. *Ovary* hirsute, more or less perfectly 2-celled; ovules 4; style filiform; stigmas 2, ovate-oblong. *Fruit* a globose capsule, .25 in. in diam., 1-celled, opening by 4 valves. *Seeds* 4, black, glabrous. Wight Ill. t. 168; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus bicolor*, Vahl. Symb. III. 25; Bot. Mag. t. 2205; Roxb. Hort. Beng. 14; Flor. Ind. I. 475; Flor. Ind. ed. Carey & Wall. II. 57; Wall. Cat. 1410. *C. bracteatus*, Vahl Symb. III. 25. *C. involucreatus*, Ker in Bot. Reg. t. 318 (not of Spreng.). *Ipomœa bicolor*, Sweet Hort. Brit. ed. 2, 372. *I. bracteata*, Bl. Bijdr. 711 (not of Willd. nor of Wight). *I. Weinmanni* Roem. & Schult. Syst. Nat. IV. 243. *Calystegia Keriana*, Sweet Hort. Brit. ed. 2, 370. *Palmia bicolor*, Endl. ex Dalz. & Gibs. Bomb. Flor. 163. *Shuteria bicolor*, Choisy Convolv. Or. 104, and in DC. Prod. IX. 435; Flor. des Serres t. 421. *Aniseia Afzelii*, G. Don Gen. Syst. IV. 295. *A. bracteata*, Hassk. Pl. Jav. Rar. 516.



PERAK: Larut, *Scortechini*!—DISTRIB. Tropical Africa, S.E. Asia generally, Polynesia.

#### 9. ANISEIA, Choisy.

Twining herbs. *Leaves* elliptic, mucronulate or lanceolate. *Flowers* axillary, solitary or in few-flowered cymes. *Sepals* 5, herbaceous, acuminate; outer 3 the larger, ovate, decurrent on the peduncle and accrescent in fruit; inner 2 smaller, lanceolate, unaltered in fruit. *Corolla* wide-infundibuliform; tube hirsute externally except on spaces opposite the sepals, with 5 distinct vertical bands; limb sub-entire. *Stamens* 5, adnate to corolla-tube, included; filaments filiform. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a 2-celled, 4-valved capsule. *Seeds* 4, large, black, smooth.—DISTRIB. Species about 5, all confined to America but one, which is cosmopolitan in the tropics.

ANISEIA MARTINICENSIS, Choisy Convolv. Rar. 144. A slender herb creeping in wet places or climbing, glabrous or with a few adpressed hairs. *Leaves* oblong-lanceolate, apex obtuse with a mucro, base cuneate; glabrescent; .75 to 3 in. long, .5 to 1 in. wide; petiole .6 in. long. *Flowers* axillary solitary; peduncles 1 in. long, with 2 minute, persistent bracts about the middle. *Sepals* unequal, the outer ovate-acute .6 in. long, the inner narrower, green, glabrescent; in fruit accrescent at length .75 to 1 in. long, the 2 outer then sub-cordate-ovate scarious, strongly nerved, decurrent on the peduncle; the inner lanceolate. *Corolla* white, campanulate, tube 1 in. long, pubescent outside; limb 1 in. across. *Capsule* ovoid, glabrous, .5 in. long. *Seeds* with minutely strigose margins. Choisy in DC. Prod. IX. 430; Hallier f. Engl. Bot. Jahrb. XVIII. 96, and Bull. Herb. Boiss. V. 332. *A. uniflora*, Choisy Convolv. Or. 101, t. 2, f. 9, and in DC. Prod. IX. 431; Wight Ic. t. 850. *Convolvulus martinicensis*, Jacq. Am. 20, t. 17. *C. uniflorus*, Lamk Encyc. Meth. III. 544; Burm. Fl. Ind. 47, t. 21. *C. emarginatus*, Vahl Symb. III. 23. *C. Rheedei*, Wall. Cat. 1358; Roxb. Flor. Ind. ed. Carey & Wall. II. 70. *Ipomœa martinicensis*, Mez Prim. Fl. Esseq. 98. *I. uniflora*, Roem. & Schult. Symb. IV. 247; Clarke in Hook. f. Flor. Brit. Ind. IV. 201. *I. lanceolata*, G. Don Gen. Syst. IV. 232.

PERAK: Kwala Dipong, *Scortechini* 1780! Kota Bahru, *King's Collector* 1075! MALACCA: *Griffith*!—DISTRIB. Tropics generally.

#### 10. JACQUEMONTIA, Choisy.

Climbing or twining herbs or undershrubs; stems and leaves usually pubescent. *Leaves* usually cordate or elliptic, entire or rarely toothed or lobed. *Flowers* axillary, in compound umbellate or capitate

cymes, very rarely solitary; bracts small, rarely leafy. *Sepals* 5, equal or unequal. *Corolla* usually small; tube infundibuliform with a wide or narrow throat, and with 5 vertical bands each ending in 2 distinct nerves; limb plicate. *Stamens* 5, adnate to corolla-tube, included. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigmas 2, linear or elliptic-oblong. *Fruit* a globose 2-celled capsule, usually 8-valved, rarely 4-valved. *Seeds* normally 4, usually glabrous, often slightly winged along the margins.—**DISTRIB.** Species 60 to 70, mostly in Brazil; 2 to 3 in S.E. Asia.

*JACQUEMONTIA PANICULATA*, Hallier f. Engl. Bot. Jahrb. XVI. 541; XVIII. 95. A slender climber; stems twining, puberulous. *Leaves* ovate-cordate, acute, entire, pubescent beneath, puberulous at length glabrescent above, 1.5 to 3 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* axillary, in small dense many-flowered sub-capitate cymes; peduncles puberulous, 1 to 1.5 in. long; bracts inconspicuous. *Sepals* 5, ovate-cordate, pubescent, .25 in. long, not altered in fruit. *Corolla* tubular, .5 in. long; mouth narrow, limb pink or white, shortly acutely 5-lobed. *Capsule* globose, glabrous, .2 in. in diam. *Seeds* glabrous. *Convolvulus parviflorus*, Vahl. Symb. III. 29; Roxb. Flor. Ind. ed. Carey & Wall. II. 51; Choisy Convolv. Or. 98, and in DC. Prod. IX. 413; Clarke in Hook. f. Flor. Brit. Ind. IV. 220. *C. asclepiadeus*, Wall. Cat. 1396. *Ipomœa paniculata*, Burm. Flor. Ind. 50, t. 21, f. 3. *I. parviflora*, Pers. Synops. I. 183 (not of Vahl).

**PERAK:** Kampong Kota, Wray 3337!—**DISTRIB.** Tropical Africa, S.E. Asia generally, Australia.

#### 11. MERREMIA, Dennst.

Shrubs or herbs, usually climbing, rarely erect or prostrate; stems very rarely winged. *Leaves* entire, lobed, or divided. *Flowers* axillary, usually long-peduncled, solitary or in few-flowered, rarely many-flowered cymes; bracts small. *Sepals* 5, sub-equal, elliptic or lanceolate, acuminate, rarely rounded or truncate, convex, usually slightly accrescent in fruit. *Corolla* campanulate, white, less often yellow or orange, the tube with 5 vertical bands each usually marked by 5 dark-violet lines; limb plicate, margin slightly 5-lobed. *Stamens* 5, unequal, included or exserted; filaments filiform; anthers usually twisted; pollen never spinulose. *Ovary* 2-celled or occasionally 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule, 1-4-locular, sometimes the style separating with a small stopple. *Seeds* 4, rarely fewer, dull, glabrous, rarely puberulous.—**DISTRIB.** Species about 40, in all warm countries.

Corolla glabrous externally :—

Leaves not peltate :—

Leaves deeply 5-lobed ; flowers large .. .. 1. *M. vitifolia*.

Leaves entire or very slightly lobed ; flowers small :—

Sepals acuminate ; flowers yellow with a pink or purple eye :—

Leaves acute at apex .. .. 2. *M. hastata*.

Leaves obtuse, truncate, or 3-toothed at apex .. .. 3. *M. tridentata*.

Sepals obtuse : flowers without a distinct eye :—

Leaves narrow-oblong, the lower often ovate-oblong ;

flowers white with pinkish tinge or yellowish-white or

pale yellow .. .. 4. *M. caespitosa*.

Leaves ovate-cordate, margin often crenate or toothed ;

flowers clear yellow .. .. 5. *M. convolvulacea*.

Leaves peltate ; flowers large .. .. 6. *M. nymphaeifolia*.

Corolla somewhat hirsute or shaggy externally :—

Leaves more or less hirsute ; flowers in compact corymbose

or umbellate cymes .. .. 7. *M. umbellata*.

Leaves quite glabrous ; flowers in lax cymes .. .. 8. *M. crispata*.

1. *MERREMIA VITIFOLIA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A large climber with slender hispidly hairy branches. *Leaves* cordate, palmately 5-lobed, 2 to 6 in. across ; lobes triangular acute, often toothed or again acutely lobed ; petiole .5 to 2 in. long, hispidly hairy. *Flowers* in axillary 1-7-flowered cymes ; peduncles hispidly hairy, 1 to 4 in. long, pedicels hispidly hairy, .2 to .5 in. long. *Sepals* ovate-acute, hispid, .5 in. long, in fruit somewhat enlarged, .75 in. long. *Corolla* campanulate, clear yellow, glabrous, 1.5 in. long and nearly as wide, slightly irregular. *Capsule* depressed-globose, membranous, 2-celled, normally 4-seeded. *Seeds* glabrous. Verslag. Buitenzorg, 1895, 127, and Bull. Herb. Boiss. V. 379. *Convolvulus vitifolius*, Burm. Fl. Ind. 45, t. 18, f. 1 ; Linn. Mantiss. 203 ; Roxb. Hort. Beng. 14 ; Flor. Ind. I. 476, and ed. Carey & Wall. II. 61 ; Wall. Cat. 1348. *C. angularis*, Burm. Fl. Ind. 46, t. 19, f. 2 ; Linn. Mantiss. 203 ; Hassk. Pl. Jav. Rar. 519. *Ipomœa vitifolia*, Sweet Hort. Brit. ed. II. 372 ; Blume Bijdr. 709 ; Choisy Convolv. Or. 72, and in DC. Prod. IX. 361 ; Kurz For. Flor. Burm. II. 219 ; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. angularis*, Choisy Convolv. Or. 72.

PERAK : Larut, *Scortechini* ! ANDAMANS : Port Mouat, *Kurz* ! Narcondam, *Prain* ! NIOCBARS : Nancowry, *Prain's Collector* !—  
DISTRIB. S.E. Asia generally.

2. *MERREMIA HASTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse twining biennial herb, stem angular. *Leaves* glabrous, hastate-lanceolate, 2 to 3 in. long, .3 to .5 in. wide, apex acute ; petiole very short. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves ; bracts very small, lanceolate. *Sepals* narrow,

acuminate, .3 to .5 in. long, glabrous. *Corolla* funnel-shaped, .6 in. long, pale yellow with a purple eye; limb slightly lobed. *Stamens* 5; filaments slightly hairy at the base; anthers straight. *Ovary* and style glabrous; ovary 2-celled, each cell 2-ovuled. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 117. *Convolvulus hastatus*, Desr. in Lamk Encyc. Meth. III. 547. *C. filicaulis*, Vahl Symb. III. 24. *C. denticulatus*, Spreng. Syst. I. 603. *C. medius*, Roxb. Flor. Ind. I. 474, and ed. Carey & Wall. II. 56; Wall. Cat. 1346 (not of Linn.). *C. Blumei*, Dietr. Syn. Pl. I. 675. *Ipomœa denticulata*, R. Br. Prod. I. 485; Bot. Reg. t. 317 (not of Choisy). *I. filicaulis*, Bl. Bijdr. 721; Choisy Convolv. Or. 66; DC. Prod. IX. 353. *I. Blumei*, Steud. Nomencl. I. 815. *I. angustifolia*, Clarke in Hook. f. Flor. Brit. Ind. IV. 205 (not of Jacq., nor of Choisy). Rheed. Hort. Malab. XI. t. 55.

PERAK: Larut, *Scortechini* 138! 1833! Kwala, &c., Wray 859! 1751! Sungah Ryah, *King's Collector* 996! PENANG: Batu Gaja, &c., *Deschamps*! MALACCA: *Griffith*! Tanjong Kling and Bukit Bruang, *Hervey*! PAHANG: Pekan, *Ridley*! Katapang, *Ridley* 1236! SINGAPORE: *Hullett* 69! 232! *King's Collector* 1174! *King*!—DISTRIB. Throughout S.E. Asia, Tropical Africa, and Australia.

3. *MERREMIA TRIDENTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse glabrous herb with a woody rootstock giving off many closely decumbent elongated stems. *Leaves* glabrous, hastate-oblong, or spatulate-linear, or sub-quadrate, .5 to .8 in. long, .15 to .5 in. wide, apex obtuse truncate or 3-toothed; petiole 0. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves; bracts very small, lanceolate. *Sepals* ovate, acuminate, .25 to .35 in. long. *Corolla* funnel-shaped, .4 to .5 in. long, yellow with pink eye; limb slightly lobed. *Stamens* 5. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 116. *Convolvulus tridentatus*, Linn. Sp. Pl. 157; Roxb. Fl. Ind. I. 475, and ed. Carey & Wall. II. 56; Wall. Cat. 1347. *Evolvulus tridentatus*, Linn. Sp. Pl. ed. II. 392. *Ipomœa tridentata*, Roth Cat. Bot. II. 19; Choisy Convolv. Or. 65, and in DC. Prod. IX. 353; Clarke in Hook. f. Flor. Brit. Ind. IV. 205.

MALACCA: *Griffith* 5861/1 (K.D.)! *Maingay* 1147 (K.D.)! JOHORE: Batu Pahat, *Ridley* 11,114!—DISTRIB. India generally, Africa, Bangka.

4. *MERREMIA CÆSPITOSA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A sparsely hairy or glabrescent annual or biennial slender twining or creeping herb. *Leaves* narrowly oblong, the lower often sub-cordate and ovate-oblong, sometimes slightly hastately lobed, 1.5 to 2.5 in. long, .5 in. wide; petiole .25 to .5 in. long. *Flowers* cymose, few or many on slender peduncles 1 to 3 in. long; bracts minute, persistent. *Sepals* elliptic-obtuse, .25 in. long, margins when dry often inflexed above.



*Corolla* sub-campanulate, .75 in. long, white with a pinkish tinge or yellowish-white or yellow. *Ovary* 2-celled, each cell 2-ovuled. *Capsule* ovoid, .25 in. long, papery, 1-celled, with only a trace of the original dissepiment near the base. *Seeds* glabrous. Bull. Herb. Boiss. V. 382. *Convolvulus caespitosus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 483, and ed. Carey & Wall. II. 70; Wall. Cat. 1357. *C. Bentharii*, Wall. Cat. 1393. *Hewittia caespitosa*, Steud. Nomencl. Bot. ed. II. i. 757. *Skinneria caespitosa*, Choisy Convolv. Or. 105, t. 6, and in DC. Prod. IV. 435. *Ipomœa linifolia*, Bl. Bijdr. 721; Choisy DC. Prod. IX. 369; Benth. Fl. Austr. IV. 423; Clarke in Hook. f. Flor. Brit. Ind. IV. 205. *I. setulosa*, Zoll. & Mor. Syst. Verzeichn. 51.

PERAK: Larut, *King's Collector* 2486! MALACCA: *Griffith*! SINGAPORE: *Kurz* 2976! *Hullett* 127! 387! *King*! *King's Collector* 1193!—DISTRIB. E. Himalaya, Indo-China, Malay Archipelago, Australia.

5. MERREMIA CONVULVULACEA, Dennst. Schl. Hort. Malab. 39. A much-twining glabrous or casually hirsute often muricated herb. *Leaves* ovate-cordate, acute, glabrous, margin usually crenate or toothed, sometimes 3-lobed, 1 to 2 in. long, .5 to 1 in. wide; petiole .5 to 2 in. long. *Flowers* numerous, rather densely cymose, on axillary peduncles .5 to 3 in. long; bracts small, caducous. *Sepals* elliptic, glabrous, .2 in. long, ultimately sub-patent, margins often at length sub-involute. *Corolla* funnel-shaped, externally glabrous, yellow, .5 to .6 in. long. *Capsule* ovoid, sub-angular, at the apex rather thicker than elsewhere and often depressed, .25 in. long; cells 2. *Seeds* puberulous. *M. hederacea*, Hallier f. Engl. Bot. Jahrb. XVIII. 168, and Verslag. Buitenzorg 1895, 126. *Evolvulus hederaceus*, Burm. Fl. Ind. 77, t. 30, f. 2. *Convolvulus flavus*, Willd. Sp. Pl. 852. *C. strictus*, Vahl Symb. III. 28. *C. dentatus*, Vahl Symb. III. 25; Roxb. Flor. Ind. ed. Carey & Wall. II. 62; Wall. Cat. 1349. *Ipomœa striata*, Poir. in Lamk Encyc. Meth. Suppl. IV. 632 (*not of* Roth). *I. dentata*, Willd. ex Roem. & Schult. Syst. IV. 789. *I. subtriflora*, Zoll. & Mor. Verzeichn. 51.

PERAK: Durian, *King's Collector* 397! Larut, *Scortechini* 1832! PAHANG: Khol, *Ridley* 2168! JOHORE: Serom, *Ridley*! SINGAPORE: *Dorward*!—DISTRIB. S.E. Asia, Africa, Australia.

6. MERREMIA NYMPHÆIFOLIA, Hallier f. Verslag. Buitenzorg, 1895, 127. A large woody climber. *Leaves* orbicular-ovate, shortly acuminate, entire, glabrous on both surfaces, peltate with a rounded or slightly retuse base, 6 to 10 in. long, 5 to 8 in. wide, the floral leaves more deeply cut and at times cordate with a narrow sinus. *Flowers* large, in loose 4-15-flowered cymes on a common peduncle sometimes shorter

than the petioles, sometimes longer than the leaves. *Sepals* broad, obtuse, coriaceous, nearly equal, in flower .75 in., in fruit nearly 1 in. long. *Corolla* wide-campanulate, 2 to 2.5 in. long, glabrous externally, yellow or white or purplish. *Stamens* 5; anthers hirsute. *Capsule* sub-globose, 1 in. in diam. *Seeds* pilose. *Ipomœa nymphaeifolia*, Bl. Bijdr. 719; Prain Journ. As. Soc. Beng. LXIII. 2, 107. *I. Rumphii*, Miq. Flor. Ind. Bat. II. 605. *I. peltata*, Choisy, Convolv. Or. 70, and in DC. Prod. IX. 359; Miq. Flor. Ind. Bat. II. 605; Benth. Flor. Austral. IV. 408; Bak. Flor. Maurit. 208. *Convolvulus peltatus*, Linn. Sp. Pl. 1194. *Spiranthera peltata*, Boj. Hort. Maurit. 226. *Operculina peltata*, Hallier f. Engl. Bot. Jahrb. XVI. 549; XVIII. 119. *Chironia lanosanthera*, Nav. & Fernand. Vill. in. Blanco Flor. Fil. ed. III. Ic. II. t. 261, f. 1.

PERAK: Pangkor, *Scortechini* 1074! *Ridley* 7158!—DISTRIB. Mascarenes, S.E. Asia, Australia, Polynesia.

7. *MERREMIA UMBELLATA*, Hallier f. Eng. Bot. Jahrb. XVI. 552; *VAR. orientalis*, Verslag. Buitenzorg, 1895, 132, and Bull. Herb. Boiss. V. 381. A climbing softly hairy or almost glabrous shrub, stems often 15 to 20 feet long. *Leaves* cordate or hastate, elliptic or oblong, obtuse or shortly acute, entire or very rarely sinuate or angled, nerves rather distinct, softly hairy on both surfaces, or only beneath and glabrous except the nerves above, rarely quite glabrous above and only hairy on the nerves beneath; length 1.5 to 4 in., width 1 to 3 in.; petioles often softly hairy, .2 to .6 in. long. *Flowers* in compact corymbose cymes on axillary usually softly hairy peduncles .5 to 1 in. long; pedicels .2 to 1 in. long; bracts caducous. *Sepals* elliptic, obtuse, entire or mucronate, hairy or glabrous, .25 to .3 in. long. *Corolla* tubular-campanulate, white, or white with a yellow tinge, 1 to 1.5 in. long, lobes short, at first hirsute externally. *Capsule* globose, glabrous, .3 in. wide. *Seeds* patently hirsute with blackish hairs. *Convolvulus blandus*, Roxb. Hort. Beng. 13; Flor. Ind. I. 470, and ed. Carey & Wall. II. 50, 70; Wall. Cat. 1342. *C. cymosus*, Lamk Encycl. Meth. III. 556. *C. pentagonus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 72; Wall. Cat. 1343. *C. Rothii*, Spreng. Syst. I. 600. *Ipomœa cymosa*, Roem. & Schult. Syst. IV. 241; Blume Cat. Gewachs. Buitenz. 50; Choisy Convolv. Or. 79, and in DC. Prod. IX. 371; Bot. Reg. 1843, t. 24; Clarke in Hook. f. Flor. Brit. Ind. VI. 211. *I. bifida*, Roth Nov. Sp. 118. *I. Heynei*, Roem. & Schult. Syst. IV. 237. *I. Rothii*, Roem. & Schult. Syst. IV. 241. *I. Olanda*, Sweet Hort. Brit. ed. II. 372. *I. caliginosa*, Choisy Convolv. Or. 79, and in DC. Prod. IX. 370.

PERAK: Thaipeng, *Scortechini*! Krian, *Scortechini*! Larut, *King's Collector*! PENANG: *Wallich*! *King*! *Deschamps*! SELANGOR:

*Ridley!* ANDAMANS: very common. NICOBARS: *Kurz!* *Prain!*—  
DISTRIB. E. and S.E. Asia, Tropical Africa.

VAR. *occidentalis*, Hallier f. Verslag. Buitenzorg 1895, 127. *Leaves* wide-cordate, softly hairy on both sides, 4 in. long, 3.5 in. wide; *cymes* umbellate; *corolla* yellow. *Convolvulus umbellatus*, Wall. Cat. 2329. *Ipomœa umbellata*, Mez Prim. Flor. Esseq. 99. *I. cymosa*, var. *culta*, *Prain Journ. As. Soc. Beng. LXIII. 2, 108.*

PERAK: Sungah Ryah, *Kunstler* 912!—DISTRIB. Bengal, naturalised; Tropical America.

8. MERREMIA CRISPATULA, *Prain Beng. Pl. II. 730*; var. *andamanica*, *Prain*. A large glabrous scandent herb. *Leaves* ovate-cordate, acuminate, margins entire or faintly undulate, glabrous on both surfaces, 3 to 4 in. long, 2.5 to 4 in. wide; *petiole* 1 to 1.5 in. long. *Flowers* in axillary few-flowered cymes, *peduncles* 1.5 to 2 in. long, *pedicels* .75 to 1.25 in. long, thickened upwards. *Sepals* orbicular, .5 in. long, in fruit .75 in. long. *Corolla* campanulate, limb hardly lobed, tube hirsute externally, yellow, 1.25 in. long. *Capsule* sub-orbicular, .75 in. across. *Seeds* minutely velvety, margins somewhat shaggy. *Ipomœa petaloidea*, var. *andamanica*, *Prain Journ. As. Soc. Beng. LXIII. 2, 110.*

ANDAMANS: S. Andaman, common.

This is in all probability specifically distinct from *Merremia crispatula* (*Ipomœa petaloidea*, Choisy), but it seems preferable to treat it for the moment as a variety of that species and not as a new species, because of its remarkable resemblance to *Merremia Riedeliana*, Hallier f. (*Ipomœa Riedeliana*, Oliv.), and *Merremia mammosa*, Hallier f. (*Ipomœa mammosa*, Choisy). From the former, as described and figured by Oliver, this differs in having a 4-celled ovary with 1 ovule in each cell, whereas *M. Riedeliana* has a 2-celled ovary with 4, sometimes 5, ovules in each cell. From *M. mammosa*, as figured by Rumphius, this differs in having obtuse calyx-lobes and a shaggy corolla; Rumphius' figure shows the sepals acute and the corolla glabrous. This plant appears to be the same thing as *Convolvulus platypeltis*, Span., from Timor, and if it proves to be distinct alike from *M. Riedeliana* and *M. mammosa*, which last is cited by Dr. Hallier as an Andaman plant, though we have no authentic example of *M. mammosa* from the Andamans at Calcutta, the name it should bear will be *Merremia platypeltis*.

## 12. OPERCULINA, Manso.

Large herbaceous climbers; stems, peduncles and petioles usually winged. *Leaves* large, entire or lobed, rarely peltate. *Flowers* large, showy, axillary, solitary or often in few-flowered cymes. *Sepals* 5, large, ovoid, glabrous, accrescent in fruit and ultimately irregularly splitting from the tip. *Corolla* infundibuliform, rarely campanulate; tube with 5 vertical smooth bands. *Stamens* 5; filaments filiform; anthers large, at length contorted; pollen never spinulose. *Ovary* 2-celled, glabrous; ovules 4; style filiform; stigma 2-globose. *Fruit* a capsule, not

opening by valves; the epicarp circumscissile above the middle, the cap in separating carrying away the style; the endocarp at first entire, at length rupturing irregularly. *Seeds* usually solitary, rarely more than one, black, smooth or furred, usually large.—DISTRIB. Species 15, tropics generally.

Stems winged; bracts large, coloured; flowers white or pale yellow;  
leaves softly pubescent, not palmate .. .. 1. *O. Turpethum*.  
Stems not winged; bracts small: flowers brilliant yellow; leaves  
glabrous, deeply palmately lobed .. .. 2. *O. tuberosa*.

1. OPERCULINA TURPETHUM, Manso En. Pl. Bras. 16, n. 49. A stout softly pubescent climber, with strong twining 4-angled or compressed less often sub-cylindric winged stems, wings membranous. *Leaves* large, ovate or oblong, obtuse or acute, 2 to 5 in. long, 1 to 3 in. wide, base cordate or truncate; petiole 1 in. long. *Flowers* axillary, in few-flowered cymes; peduncles 1 to 4 in. long; bracts oblong, 1 in. long, sometimes pinkish-purple, caducous. *Sepals* 5, ovate, softly pubescent, .5 in. long; in fruit accrescent orbicular, concave, scarious and fissile, 1 in. long. *Corolla* white or pale yellow, tubular-campanulate, 1.5 in. long. *Stamens* 5, included, anthers at length contorted. *Capsule* globose, .5 to .75 in. across. *Seeds* 4 or fewer, glabrous. Hallier f. Engl. Bot. Jahrb. XVIII. 120, and Verslag. Buitenzorg, 1895, 128. *Convolvulus Turpethum*, Linn. Sp. Pl. 155; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 57, and Flor. Ind. I. 476; Wall. Cat. 1371; Bot. Mag. t. 2093; Hassk. Pl. Jav. Rar. 518. *O. anceps*, Linn. Mantiss. 43. *C. triquetra*, Vahl Symb. III. 30. *Ipomœa Turpethum*, R. Br. Prod. I. 485; Bot. Reg. t. 279; Choisy Convolv. Or. 68, and in DC. Prod. IX. 360; Kurz For. Flor. Burm. II. 218; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. anceps*, Roem. & Schult. Syst. IV. 231; Bl. Bijdr. 714; Choisy Convolv. Or. 68, and in DC. Prod. IX. 360. *I. triquetra*, Roem. & Schult. Syst. IV. 231. *Spiranthera Turpethum*, Boj. Hort. Maurit. 226. *Argyreia alulata*, Miq. Flor. Ind. Bat. II. 587.

ANDAMANS: Narcondam, Prain! NICOBARS: Kamorta, Kurz!  
MALACCA: Griffith!—DISTRIB. E. Africa, S.E. Asia, Australia, Polynesia.

2. OPERCULINA TUBEROSA, Meissn. in Mart. Fl. Bras. VII. 212. A stout glabrous climber with strong twining smooth or muricate stems. *Leaves* large, ovate, deeply palmately lobed; lobes elliptic-lanceolate, acuminate, entire, 3 to 5 in. across; petiole 2 to 5 in. long. *Flowers* axillary in many-flowered cymes; peduncles 2 to 6 in. long; bracts deciduous; pedicels .25 to 1 in. long. *Sepals* 5, elliptic-oblong, obtuse; accrescent in fruit and spreading, ultimately 2 in. long, 1 to 1.5 in. wide. *Corolla* yellow, tubular-campanulate, 2 in. long. *Stamens* 5, included,



anthers twisted. *Capsule* globose, .3 in. wide; peduncle somewhat thickened. *Seeds* furred along the angles. Hallier f., in Engl. Bot. Jahrb. XVI. 476, 549; XVIII. 119; Verslag. Buitenzorg 1895, 128, and Bull. Herb. Boiss. VII. 410. *Ipomœa tuberosa*, Linn. Sp. Pl. 160; Choisy in DC. Prod. IX. 362 (*partly*).

SINGAPORE: *Hullett* 645, in cultivation.—DISTRIB. America, Africa, India, Malaya, New Caledonia.

#### LEPISTEMON, Bl.

Stout climbing herbs, with villous stems. *Leaves* cordate, often more or less lobed. *Flowers* in very dense axillary cymes; bracts narrow, deciduous. *Sepals* 5, sub-equal, herbaceous, hispid or glabrous, acute or obtuse. *Corolla* small, yellowish-white; tube hirsute externally, narrowed and shortly cylindric at base, urceolate above; limb shortly 5-lobed. *Stamens* 5, included; filaments dilated at their bases into 5 sub-equal, concave scales arched over the ovary; *disk* large cupular. *Ovary* 2-celled; ovules 4; style very short; stigma 2-partite, sub-capitate. *Fruit* a 4-valved capsule. *Seeds* glabrous.—DISTRIB. Species 3, S.E. Asiatic and African.

LEPISTEMON FLAVESCENS, Bl. Bijdr. 722. A climber with stout fulvous-villous stems. *Leaves* ovate-cordate, acute, entire or often distinctly 3-lobed, densely tawny-tomentose on both surfaces; 3 to 5 in. wide; petiole 1 to 2 in. long. *Flowers* yellowish-white in closely 10-30-flowered axillary cymes, sessile or on short peduncles .25 to .5 in. long; bracts tawny-hirsute, .2 in. long, deciduous. *Sepals* 5, rather narrowly ovate to lanceolate, sub-acute to rather finely acuminate, densely patent sub-strigose, .35 to .4 in. long. *Corolla* narrow and hyaline at the base, membranous and from slightly to widely urceolate above; tube hirsute externally; limb widely infundibuliform. *Stamens* 5, the basal processes papillose or hirsute, included in the lower part of the corolla-tube and overarching the short style; filaments glabrous, included in the upper part of the corolla-tube. *Ovary* 2-celled; ovules 4; style very short; stigma 2-lobed, lobes sub-globose. *Capsule* ovoid, glabrous, 2-celled, 4-valved, .25 in. long, normally 4-seeded. *Seeds* glabrous. Miq. Flor. Ind. Bat. II. 629; Prain Journ. As. Soc. Beng. LXIII. 2, 111; Wight Ic. t. 1362; Choisy in DC. Prod. IX. 348. *L. Wallichii*, Choisy Convolv. Or. 61, and in DC. Prod. IX. 348; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus cephalanthus*, Wall. Cat. 1402. *C. binectariferus*, Wall. in Roxb. Flor. Ind. ed. Carey & Wall. II. 47. *Vallaris controversa*, Spreng. Syst. cur. post. 65. *Ipomœa Wallichii*, Steud. Nomencl. Bot. *Nemodon* sp., Griff. Notul. IV. 286.

PERAK: Larut, *Scortechini* n. 1544! Goping, *King's Collector* 987! 1059!—DISTRIB. Assam, Tenasserim, Chittagong, Java, Borneo, Philippines.

The three gatherings from Perak agree with each other in every respect. They differ from the plant as it occurs in Tenasserim, in having a more widely urceolate corolla and even longer and more lanceolate sepals; at the same time they differ from the plant as it occurs in the Malay Archipelago, in having the sepals narrowly lanceolate and acuminate, instead of ovate and sub-acute. As regards corolla, however, they are exactly like the species as it occurs elsewhere in Malaya. Since the Perak plant combines the characters of the two previously recognised species—*L. Wallichii* with long acuminate sepals and *L. flavescens* with wide-urceolate corolla—it appears to afford conclusive proof of the suggestion already made by Clarke, *l.c.*, that the Assamese and the Malayan plants are no more than forms of one somewhat variable species. An Indian form occurs in Travancore; this has been characterised by Stapf as a distinct species, *L. leiocalyx*, probably quite justly, since the Travancore plant has quite glabrous and obtuse sepals: the same form occurs in Chittagong; otherwise, however, the Indian plant agrees with the forms reported from Indo-China and Malaya.

#### IPOMEEA, Linn.

Herbs, rarely shrubs, twining or prostrate, less often sub-erect or erect. *Leaves* alternate, entire lobed or divided. *Flowers* axillary, solitary or in cymes, the cymes rarely paniculate, or in terminal spikes; bracts various. *Sepals* 5, ovate or linear, equal or unequal. *Corolla* campanulate or infundibuliform; limb plicate, very slightly 5-lobed. *Stamens* 5, included or very rarely exserted; filaments filiform or dilated at the base, often somewhat unequal; anthers straight or contorted; pollen spinulose. *Ovary* 1-3-celled, rarely 4-celled; ovules 4, rarely 6; style filiform; stigma capitate, entire or 2-3-globose, rarely stigmas 2, linear. *Fruit* a 4-6-valved capsule, rarely indehiscent. *Seeds* 4, less often 6, rarely solitary, glabrous, bearded, or uniformly velvety or woolly.—DISTRIB. Species about 300, throughout the tropics.

Leaves softly pubescent or densely hirsute on both surfaces:—

Leaves deeply 5-7-lobed; flowers densely capitate with a whorl of involucrent bracts .. ..

1. *I. Pes-Tigridis*.

Leaves entire or slightly 3-lobed; flowers in congested cymes, with often one of the bracts foliaceous .. ..

2. *I. Leari*.

Leaves glabrous or only slightly hirsute or pubescent:—

Leaves all deeply 5- or more-lobed, glabrous:—

Leaves digitately 5-lobed, lobes nearly if not quite distinct at the base; flowers more or less white .. ..

3. *I. pulchella*.

Leaves palmately 5-7-lobed, lobes not as a rule more than three-fourths cut to the base; flowers purplish-pink .. ..

4. *I. paniculata*.

Leaves entire or slightly lobed or if (rarely) deeply lobed the lobes only 2:—

Flowers in few-flowered axillary cymes:—

Cymes corymbose and lax or flowers 2 or solitary:—

Terrestrial, firm-stemmed plants :—

Flowers purple :—

Leaves ovate-cordate, acute or acuminate, entire or more or less lobed :—

Cultivated species with tuberous edible roots, often without flowers, rarely with seeds .. 5. *I. Batatas*.

Wild plants or if grown in gardens with the roots not edible :—

Large stout climbers on bushes near sea-coasts; flowers large, 4 in. long; sepals obtuse .. .. 6. *I. illustris*.

Slender climbers; flowers never more than 1.5 in. long; sepals acute or acuminate :—

Climbing or trailing herbs on sea-beaches; flowers 1.5 in. long .. 7. *I. denticulata*.

Climbing herbs in gardens, or garden escapes; flowers .5 in. long .. 8. *I. triloba*.

Leaves oblong, obtuse or 2-lobed; littoral sand-binding creepers .. .. 9. *I. Pes-Caprae*.

Flowers white or yellowish-white; leaves oblong or linear-oblong, emarginate, sometimes lobed, occasionally lyrate; littoral sand-binding creepers .. 10. *I. littoralis*.

Aquatic or palustrine herbs; stems soft, thick and spongy, trailing and rooting on wet mud or floating in ponds and ditches; flowers purple .. 11. *I. reptans*.

Cymes subumbellate, dense; flowers pale purple, or white with a darker purple eye .. 12. *I. sagittifolia*.

Flowers in many-flowered rather condensed axillary panicles; flowers white, slightly tinged with pink .. { 13. *I. staphylina*,  
VAR. *malayana*.

1. *IPOMŒA PES-TIGRIDIS*, Linn. Sp. Pl. 162. A hirsute twining herb; stems patently hirsute. *Leaves* hirsute on both surfaces, deeply 5-9-lobed, lobes elliptic, acuminate, narrowed at the base; length 1 to 5 in., width 1 to 4 in.; petiole 1 to 2 in. long. *Flowers* densely capitate, on axillary hirsute peduncles .5 to 3 in. long; the heads surrounded by a whorl of fulvous-hirsute bracts, the outer ovate or elliptic-oblong with cuneate or rounded bases 1 in. long, the inner narrower acute .5 to .75 in. long. *Sepals* lanceolate, acute, tawny-hirsute, .3 to .5 in. long, scarcely altered in fruit. *Corolla* 1.25 in. long, sparsely strigose externally, infundibuliform with rather narrow tube and abruptly widened mouth, pink. *Capsule* ovoid, .25 in. long, glabrous, chartaceous. *Seeds* minutely velvety. Roxb. Flor. Ind. ed. Carey & Wall. II. 93; Bl. Bijdr. 709; Wight Ic. t. 836; Choisy Convolv. Or. 73, and in DC. Prod. IX. 363; Clarke in Hook. f. Flor. Brit. Ind. IV. 204; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus Pes-Tigridis*, Spreng. Syst. I. 592; Wall. Cat. 1374. *C. bryoniaefolius* Salisb. Prod. 125. *Convolvuloides palmata*, Moench. Meth. 452. Rheede Hort. Malab. XI. t. 59.

MALACCA: *Griffith!*—DISTRIB. Tropical Africa, S.E. Asia generally.

2. *IPOMEEA LEARI*, Paxt. Bot. Mag. VI. 267. A large hirsute climber, with perennial root. *Leaves* widely or deeply cordate, acute, entire or slightly 3-lobed, softly sparingly hirsute above, more densely beneath; length 3 to 6 in., width 2 to 5 in.; petiole hirsute, 2 to 3 in. long. *Flowers* in congested 3-7-flowered cymes on axillary softly pubescent peduncles 3 to 7 in. long; bracts linear acuminate .3 to .4 in. long, with casually a foliaceous bract 1.5 in. long, .3 to .5 in. wide, with a cuneate, less often sub-cordate base, close to the flowers. *Sepals* lanceolate, acuminate, .75 in. long, pubescent. *Corolla* abruptly campanulate from a narrow cylindric base, tube 2.75 to 3 in. long, purple-blue or mixed red and blue, changing with age. *Fruit* not seen. *I. congesta*, Prain Journ. As. Soc. Beng. LXIII. 2, 104 (not of R. Br.). *Pharbitis Learii*, Hook. Bot. Mag. t. 3928; Choisy in DC. Prod. IX. 343.

SINGAPORE: *Hullett!*—DISTRIB. Cultivated throughout the tropics, native of America.

Mr. Hullett, whose plant was probably an escape, notes on his specimen (*Hullett* 646): "January, 1885: blue convolvulus, wild? Have never seen it in seed."

3. *IPOMEEA PULCHELLA*, Roth Nov. Sp. 115. A glabrous twining herb. *Leaves* glabrous, digitate, 5-lobed, lobes ovate-acute, base cuneate, central largest 1.25 to 1.5 in. long, .5 to .75 in. wide, basal smallest .5 to .75 in. long, .3 to .5 in. wide; petiole glabrous, .75 to 2 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles .25 to 1.25 in. long; bracts minute, deciduous; pedicels .5 in. long, with small ovate sub-persistent bracteoles below the middle. *Sepals* ovate, glabrous, .2 to .25 in. long, the inner obtuse, the outer sub-acute. *Corolla* campanulate, 2 in. long, white or with a tinge of rose. *Capsule* globose, glabrous, .5 in. wide. *Seeds* villous. Wight Ic. 158; Choisy in DC. Prod. IX. 386. *I. palmata* Clarke in Hook. f. Flor. Brit. Ind. IV. 386 in part (not *I. palmata*, Forsk = *I. cairica*, Sweet).

MALACCA: *Maingay*. SINGAPORE: Tanglin, *Ridley* 5817!—DISTRIB. India, Indo-China.

Mr. Ridley's specimens may be from plants escaped from cultivation; they are noted as "from behind the stable, Tanglin." This is one of two species often cultivated in India under the name of the "Railway Creeper"; the other species so termed is the American *Merremia quinquefolia*, Hallier f.; the latter we have not yet received from the Malay peninsula, though it has already escaped and become domesticated near Port Blair in the Andamans.

4. *IPOMEEA PANICULATA*, R. Br. Prod. I. 486. A large scandent perennial climber with a tuberous root; stems glabrous. *Leaves* palmately 5-7-lobed, glabrous, the lobes sometimes cut almost to



the base, lanceolate or elliptic, often spathulate; length 3 to 7 in., width 2.5 to 6 in.; petiole 2 to 5 in. long. *Flowers* in many-flowered axillary cymes, on peduncles 2 to 6 in. long; pedicels .25 to .75 in. long; bracts deciduous. *Sepals* elliptic, shortly acute, glabrous, .25 to .3 in. long, enlarged and concave in fruit, .4 to .5 in. long. *Corolla* 1.5 to 2.25 in. long, glabrous externally, wide-campanulate, purplish-pink. *Stamens* 5, anthers straight. *Ovary* 4-celled for three-fourths of its height or throughout. *Capsule* ovoid, .3 in. long, 4-celled throughout, 4-valved. *Seeds* woolly with long hairs which protrude from the chinks of the capsule. Bl. Bijdr. 709; Bot. Reg. t. 62; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus paniculatus*, Linn. Sp. Pl. 223; Roxb. Flor. Ind. I. 478, and ed. Carey & Wall. II. 63; Wall. Cat. 1350; Spreng. Syst. I. 591. *C. platensis*, Spreng. Syst. I. 591. *C. insignis*, Spreng. Syst. I. 592. *C. roseus*, Kunth in Humb. & Bonpl. III. 108 (not of Miller). *Ipomœa digitata*, Linn. Syst. ed. X. 924; Meissn. in Mart. Fl. Brasil. VII. 278; Choisy in DC. Prod. IX. 389; Clarke in Hook. f. Flor. Brit. Ind. IV. 202. *I. mauritiana*, Jacq. Hort. Schoenbr. II. 39, t. 200. *I. gossypifolia*, Willd. Enum. Hort. Berol. 208. *I. eriosperma*, Beauv. Fl. Owar. & Benin II. 73, t. 105. *I. insignis*, Andr. Bot. Rep. t. 665; Bot. Reg. t. 75; Bot. Mag. t. 1790. *I. tuberosa*, G. F. W. Mey. Prim. Fl. Esseq. 102. *I. platensis*, Ker-Gawl. Bot. Reg. t. 333; Bot. Mag. t. 3685; Choisy in DC. Prod. IX. 387. *Batatas paniculata*, Choisy Convolv. Or. 54, t. 1, f. 2, and in DC. Prod. IX. 339; Wight Madr. Journ. Lit. IV. t. 11. *B. edulis*, var.  $\gamma$ , Choisy in DC. Prod. IX. 339.

PERAK: *Scortechini*! PENANG: *Wallich* 1350! *Deschamps*! SINGAPORE: Chan-chu-kang, *Ridley* 3909!—DISTRIB. Cosmopolitan in the tropics.

5. *IPOMŒA BATATAS*, Lamk Encycl. Meth. VI. 14. A trailing or twining glabrous or sparingly hairy herb with tuberous roots; tubers red, white, or occasionally yellow. *Leaves* ovate-cordate, acute, entire or angular or somewhat lobed; 2 to 4 in. long, 2 to 3.5 in. wide; petiole 2 to 5 in. long. *Flowers* in few-flowered cymes, very often none produced, on axillary peduncles 1 to 4 in. long; pedicels .25 to .5 in. long; bracts small, lanceolate, deciduous. *Sepals* narrowly oblong, acute, the outer shorter, .5 to .6 in. long. *Corolla* 1 to 2 in. long, purplish, glabrous externally, campanulate. *Stamens* 5, filaments slightly hirsute at the base. *Ovary* 4-celled, glabrous, half-enveloped by the undulate disk. *Capsule* 4-celled, or casually 3-1-celled by suppression. *Seeds* glabrous. Bl. Bijdr. 712; Meissn. in Mart. Fl. Brasil. VII. 282; Clarke in Hook. f. Flor. Brit. Ind. IV. 202; Hallier f. Bull. Herb. Boiss. V. 380. *I. Catesbaei*, G. F. W. Mey. Prim. Fl.

Esseq. 103. *Convolvulus Batatas*, Linn. Sp. Pl. 154; Roxb. Flor. Ind. I. 483, and ed. Carey & Wall. II. 69; Wall. Cat. 1356. *C. indicus*, Moris. Hist. II. sect. I. t. 3, f. 4. *C. edulis*, Thunb. Fl. Japon. 84. *C. esculentus*, Salisb. Prod. 123. *Batatas edulis*, Choisy Convolv. Or. 53, and in DC. Prod. IX. 338. *B. xanthorrhiza* Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 130. Rheede Hort. Malab. VII. t. 50.

PERAK: Larut; *Scortechini* 1836! but doubtless also present in other provinces, cultivated.

The Sweet Potato; very rarely seen in flower, still more rarely in fruit. A native of America, but now grown throughout the tropics.

6. *IPOMCEA ILLUSTRIS*, Prain Beng. Pl. II. 735. A glabrous climber. *Leaves* ovate or oblong, cordate or hastate, entire, glabrous, apex acuminate; nerves rather prominent; 4 to 6 in. long, 3.5 to 5 in. wide; petiole 1.5 to 2 in. long. Flowers in axillary cymes; peduncles 1 to 1.5 in. long, usually 2-3-flowered, often 1-flowered; bracts caducous; pedicels .5 to 1.5 in. long. *Sepals* orbicular, obtuse, glabrous, .3 to .4 in. long. *Corolla* rather wide-campanulate, purple, 4 to 4.5 in. long, glabrous, limb 3 in. wide. *Capsule* .5 in. wide, globose. *Seeds* with long silky hairs. *I. campanulata* var. *illustris*, Clarke in Hook. f. Flor. Brit. Ind. IV. 211.

ANDAMANS: on the coasts, everywhere. PENANG: Pulo Boetong, Curtis 1970!—DISTRIB. Coasts of Ceylon, Sunderbuns, Indo-China, and Malay Archipelago.

This is very nearly allied to *I. campanulata*, Linn., which appears, however, to be always an inland species, whereas this is always a littoral plant. *I. illustris* differs further in having flowers at least one-half larger, sepals quite glabrous, and fewer flowers to the cyme.

7. *IPOMCEA DENTICULATA*, Choisy in DC. Prod. IX. 379 (not of R. Br.). A glabrous trailing or twining littoral herb. *Leaves* ovate-cordate, acute, entire denticulate angled or sub-lobate, base rather deep-cordate with an obtuse sinus, firm in texture but hardly fleshy; 1 to 2.5 in. long, .75 to 1.75 in. wide; petiole 1.5 in. long. Flowers axillary on short 1-3-flowered peduncles, never more than 1.5 in. long; pedicels (often only one) 1 to 1.25 in. long; bracts .2 in. long, linear. *Sepals* elliptic, abruptly acute, sub-scarious, .4 in. long. *Corolla* 1.5 in. long, tube funnel-shaped, abruptly widening at the mouth, purple. *Ovary* 2-celled. *Capsule* globose, .3 in. in diam., glabrous. *Seeds* smooth. Benth. Fl. Austr. IV. 421; Clarke in Hook. f. Flor. Brit. Ind. IV. 298; Hallier f. Engl. Bot. Jahrb. XVI. 554. *I. littoralis*, Bl. Bijdr. 713 Thw. Enum. 211 (not of Boiss.). *I. subdentata*, Miq. Fl. Ind. Bat. II. 614. *I. cymosa*, Bak. Fl. Maurit. 208 (not of Roem. & Schult.). *I.*

*nicobarica*, Kurz in Journ. As. Soc. XLV. 2, 141. *Convolvulus denticulatus*, Lamk Encycl. Meth. III. 540.

PERAK: Dindings, *Scortechini* 1066! *Curtis* 3449! PENANG: Bagan Jumal, *Curtis* 1974! PAHANG: Rumpin, *Ridley*! NICOBARS: common. ANDAMANS: very common.—DISTRIB. Coasts of the Indian and Pacific Oceans, from the Seychelles to Polynesia.

This species, in the writer's experience, prefers shingle beaches, though occasionally it is to be met with on sandy beaches along with *I. biloba*.

8. *IPOMŒA TRILOBA*, Linn. Sp. Pl. 229. A twining or prostrate herb with glabrous slightly angular stem. *Leaves* cordate, acuminate to an often rounded tip, entire or toothed or occasionally 3-lobed; 1.5 to 2 in. long, 1.25 to 1.75 in. wide; petiole slender, 1.75 to 2 in. long. *Flowers* in axillary 1-4-flowered cymes; peduncles 1 to 1.5 in. long; bracts lanceolate, .2 in. long, deciduous; pedicels .25 to .35 in. long. *Sepals* lanceolate, acuminate, ciliate with spreading yellowish hairs, .35 in. long. *Corolla* tubular, purple, .5 in. long. *Capsule* pilose. Choisy in DC. Prod. IX. 383.

SINGAPORE: *Hullett*!—DISTRIB. Cultivated in the tropics; native of America.

Under his n. 68, Mr. Hullett sent to Calcutta, in 1884, as *Ipomœa coccinea*, a mixture of two species, one of which is *Quamoclit phanicea*, the other being *Ipomœa triloba*; as they are not noted as cultivated it seems possible that *I. triloba* may at least casually occur as an escape at Singapore. For the detection of this mixture, which had not been observed by the writer when arranging the Calcutta *Convolvulaceæ* in 1894 (see Journ. As. Soc. Beng. LXIII. 2, 83 *et seq.*), we are indebted to Dr. H. Hallier.

9. *IPOMŒA PES-CAPRÆ*, Roth Nov. Sp. 109. A glabrous extensive sand-binding creeper. *Leaves* orbicular or oblong, obtuse emarginate or 2-lobed; 1 to 4 in. long and sometimes wider than long; thick, fleshy, when dry distinctly nerved; petiole 1 to 4 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles 1 to 4 in. long; bracts .2 in. long, lanceolate, deciduous; pedicels .75 to 1.5 in. long. *Sepals* ovate, obtuse, glabrous, .5 to .6 in. long, slightly enlarged in fruit. *Corolla* tubular-campanulate, glabrous, 2 in. long, purple. *Capsule* ovoid, glabrous, .5 in. long. *Seeds* villous. Choisy Convolv. Or. 63, and in DC. Prod. IX. 349; Meissn. in Mart. Fl. Brasil. VII. 256; Hallier f. Bull. Herb. Boiss. V. 381. *I. biloba*, Forsk. Flor. Ægypt-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. maritima*, R. Br. Prod. 486; Bl. Bijdr. 720; Bot. Reg. t. 319. *Convolvulus Pes-Capræ*, Linn. Sp. Pl. 159; Roxb. Hort. Beng. 14, Flor. Ind. I. 486, and ed. Carey & Wall. II. 74; Wall. Cat. 1360. *C. maritimus*, Lamk Encycl. Meth.

III. 550. *C. bilobatus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 73; Wall. Cat. 1359. *Batatas maritima*, Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 159, f. 1. Rheede Hort. Malab. XI. t. 57.

PENANG: on the coast, *Deschamps* !—DISTRIB. Sea-shores of all tropical countries.

10. *IPOMŒA LITTORALIS*, Boiss. Fl. Orient. IV. 112. A glabrous or slightly puberulous sand-binding creeper. *Leaves* oblong, emarginate or lobed, often deeply so, and sometimes linear-oblong or linear or sub-lyrate, nerves very obscure; length 1.25 to 1.5 in., width .25 to .75 in.; petiole 1 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles 1 in. long; bracts .2 in. long, linear-lanceolate, sub-persistent; pedicels in fruit slightly clavate, .75 to 1 in. long. *Sepals* ovate-obtuse or ovate-lanceolate, .6 in. long, obtuse with or without a terminal mucro. *Corolla* white or yellowish-white, 1.75 to 2 in. long, campanulate. *Capsule* ovoid, glabrous, .4 in. long. *Seeds* villous. Hallier f. Engl. Bot. Jahrb. XVI. 555. *I. carnos*a, R. Br. Prod. 485; Benth. Fl. Austral. IV. 419; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. acetosæfolia*, Roem. & Sch. Syst. IV. 246; Meissn. in Mart. Fl. Brasil. VII. 255, t. 94. *I. longifolia*, Benth. Pl. Hartweg. 16; Bot. Reg. 1840, t. 21. *Convolvulus littoralis*, Linn. Sp. Pl. 227. *C. acetosæfolius*, Vahl Eclog. I. 18. *C. arenarius*, Vahl Symb. I. 18. *C. carnosus*, Spreng. Syst. I. 609. *C. stoloniferus*, Cyril. Pl. Rar. I. t. 5. *Batatas littoralis*, Choisy Convolv. Or. 124, and in DC. Prod. IX. 337. *B. acetosæfolia*, Choisy in DC. Prod. IX. 338.

MALACCA: *Griffith*. PAHANG: Rumpin, *Ridley* !—DISTRIB. Sea-shores of all tropical countries.

11. *IPOMŒA REPTANS*, Poir. Encyc. Meth. Suppl. III. 460. An annual glabrous aquatic, stems prostrate on mud or floating on the surface of ditches and pools, hollow and spongy, rooting at the nodes below. *Leaves* elliptic-oblong, or cordate or hastate or oblong or lanceolate, entire or angular or sub-lobate; 3 to 6 in. long, 1 to 2.5 in. wide; petiole 1 to 6 in. long. *Flowers* in axillary 1-5-flowered cymes; peduncles 2 to 7 in. long; bracts inconspicuous; pedicels 1 to 2 in. long. *Sepals* ovate, obtuse, glabrous or faintly puberulous, .4 in. long. *Corolla* 2 in. long, purple, infundibuliform-campanulate. *Capsule* ovoid, glabrous, .3 in. long, 2-4-seeded. *Seeds* glabrous or very minutely closely silky. Bl. Bijdr. 714; Choisy Convolv. Or. 62, and in DC. Prod. IX. 349; Hallier f. Bull. Herb. Boiss. V. 380. *I. aquatica*, Forsk. Flor. Ægypt.-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 210. *I. repens*, Roth Nov. Sp. 110; Bl. Bijdr. 713. *I. subdentata*, Miq. Flor. Ind. Bat. II. 614. *Convolvulus reptans*, Linn. Sp. Pl. 158; Roxb. Hort. Beng. 14. *C. repens*,



Vahl Symb. I. 17; Roxb. Fl. Ind. I. 432, and ed. Carey & Wall. II. 68; Wall. Cat. 1355 (*not of Linn.*). *C. Adansonii*, Lamk Encyc. Meth. III. 560. Rumph. Herb. Amboin. V. t. 155, f. 1. Rheede Hort. Malab. XI. t. 52.

ANDAMANS: Port Blair, *Prain!* and probably in some of the other provinces.—DISTRIB. Tropics of the Eastern Hemisphere.

12. *IPOMŒA SAGITTÆFOLIA*, Burm. Flor. Ind. 50. A perennial glabrous or at times pubescent or hirsute twining herb. *Leaves* ovate-cordate, acute, glabrous or sometimes pubescent, entire or sinuate, rarely lobed, basal lobes usually rounded; length 1 to 2·5 in., width ·75–2 in.; petiole 1 to 2 in. long. *Flowers* in axillary peduncled sub-umbellate cymes; peduncles ·5 to 7 in. long; bracts small, lanceolate, caducous; pedicels ·3 to ·5 in. long, in fruit thickened and clavate. *Sepals* ovate, sub-obtuse, slightly puberulous, ·2 in. long, when dry slightly muriculate externally. *Corolla* pale purple or white with a purple eye, 1·5 to 2 in. long; tube cylindric, limb abruptly explanate. *Capsule* ·25 to ·3 in. long, ovoid, 2–4-seeded. *Seeds* furred. *I. sepiaria*, Koen. ex Roxb. Hort. Beng. 14, Flor. Ind. I. 500, and ed. Carey & Wall. II. 90; Choisy Convolv. Or. 82, and in DC. Prod. IX. 370, Wight Ic. t. 838; Clarke in Hook. f. Flor. Brit. Ind. IV. 209. *I. striata*, Roth Nov. Sp. 111. *I. Heynei*, Wall. Cat. 1387. *Convolvulus maximus*, Vahl Symb. III. 26. *C. strictus*, Vahl Symb. III. 27. *C. marginatus*, Lamk Encyc. Meth. III. 558. *C. sepiarius*, Wall. Cat. 1384. *C. incrassatus*, Wall. Cat. 1386. Rheede Hort. Malab. XI. t. 53.

KEDAH: at 100 feet elevation, *King's Collector* 1705! MALACCA: Merliman Road, *Derry* 353! SINGAPORE: *Ridley* 6660! 11261!—DISTRIB. S.E. Asia generally.

13. *IPOMŒA STAPHYLINA*, Roem. & Schult. Syst. IV. 249; var. *malayana*, *Prain* Journ. As. Soc. Beng. LXIII. 2. 106. A glabrous scandent shrub over 90 feet long. *Leaves* glabrous, rather thick, dull green on both surfaces, sub-acute rather prominently veined; 2·5 to 4 in. long; petiole 1 to 2 in. long. *Flowers* numerous in rather dense panicles, 2·5 in. long, 2 in. wide; peduncles ·5 to 1·5 in. long; bracts small, caducous; pedicels ·1 to ·25 in. long, mostly short. *Sepals* ovate, obtuse, glabrous, ·2 in. long. *Corolla* white, slightly tinged with pink; tube narrowly funnel-shaped throughout, 1 to 1·25 in. long, hardly ·3 in. wide at the throat, limb rather narrow, abruptly explanate. *Capsule* ovoid, sub-acute, ·3 in. long, 4-seeded. *Seeds* with long silky hairs. *Convolvulus polyanthus*, Wall. Cat. 1378. *Lettsomia sumatrana*, Miq. Flor. Ind. Bat. Suppl. 560.

PENANG: *Porter* (*Wallich* 1378)! PERAK: *Larut*, *Scortechini!* *King's Collector* 1119! 2538! 5091!—DISTRIB. Sumatra.



numerous distant linear segments, glabrous; 3 to 5 in. long, 2 to 3 in. wide; petioles 1 to 3 in. long. *Flowers* in axillary lax few-flowered cymes; peduncles slender, 2 to 4 in. long; pedicels erect, if more than one virgate; bracts minute. *Sepals* 5, elliptic, .25 in. long, hardly changed in fruit. *Corolla* dark red, occasionally in cultivated varieties white; tube slender, 1 in. long; limb salver-shaped, somewhat oblique, .75 in. across. *Stamens* 5, exserted. *Capsule* smooth, ovoid, .3 in. long, completely 4-celled with membranous persistent septa. *Seeds* puberulous. Hallier f. Engl. Bot. Jahrb. XVIII. 154. *Q. vulgaris*, Choisy Convolv. Or. 52, and in DC. Prod. IX. 336. *Convolvulus pinnatus*, Desr. in Lamk Encyc. Meth. III. 567. *C. Quamoclit*, Spreng. Syst. I. 591; Wall. Cat. 1375. *Ipomæa Quamoclit*, Linn. Sp. Pl. 159; Bot. Mag. t. 244; Bl. Bijdr. 708; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 93, and Flor. Ind. I. 502; Clarke in Hook f. Flor. Brit. Ind. IV. 199.

PENANG: Batu Gaja jungles, *Deschamps* !—DISTRIB. Widely naturalised in S.E. Asia, native of America.

#### 16. CALONYCTION, Choisy.

Large herbaceous climbers, stems usually muricate. *Leaves* large, cordate, entire or angled. *Flowers* solitary or in few-flowered axillary cymes; bracts caducous. *Sepals* 5, herbaceous, smooth, usually aristate, sub-equal or the outer smaller. *Corolla* large, salver-shaped, white or rose-purple; tube narrow-cylindric; limb plicate. *Stamens* 5, adnate to corolla-tube, considerably exserted. *Ovary* glabrous, 2-locular; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule. *Seeds* 4, dull, glabrous.—Species 6 to 7, all tropical American, 2 now widespread and sub-spontaneous in the tropics of the Eastern Hemisphere.

CALONYCTION BONA-NOX, Boj. Hort. Maurit. 227. A large climber, stems smooth or muricate, glabrous. *Leaves* ovate-cordate, acute, glabrous, entire or casually lobed; 3 to 8 in. long, 2 to 4 in. wide; petiole 3 to 6 in. long. *Flowers* on axillary 1-5-flowered peduncles, 2 to 6 in. long; bracts caducous. *Sepals* 5, usually ovate, obtuse with a mucro, very slightly enlarged in fruit, glabrous; .5 in. long. *Corolla* 3 in. long; tube linear, .2 in. wide; limb salver-shaped, 3 to 5 in. wide, white. *Stamens* 5, slightly unequal, distinctly exserted. *Capsule* ovoid-oblong, narrowed upwards, 1 in. long; peduncle in fruit slightly thickened. *Seeds* glabrous. Hallier f. Bull. Herb. Boiss. V. 1028. *C. noctilucum*, Don in Sw. Hort. Brit. ed. III. 482. *C. speciosum*, Choisy Mem. Soc. Gen. VI. 441, t. 1, f. 4, and in DC. Prod. IX. 345; Hallier f. Engl. Bot. Jahrb. XVI. 556; XVIII. 153. *C. Roxburghii*, G. Don Gen. Syst. IV. 263. *Convolvulus aculeatus*, Linn. Sp. Pl. ed. I. 155. *C. bona-nox*

Spreng. Syst. I. 600. *C. grandiflorus*, Linn. f. Suppl. 136; Willd. Sp. Pl. I. 2. 859; Pers. Synops. I. 179; Wall. Cat. 1370. *C. latiflorus*, Desr. in Lamk Encyc. Meth. III. 561. *Ipomœa bona-nox*, Linn. Sp. Pl. ed. II. 228; Roem. & Schult. Syst. IV. 217; Bl. Bijdr. II. 712; Kurz For. Fl. Burm. II. 217; Clarke in Hook. f. Flor. Brit. Ind. IV. 197. *I. grandiflora*, Lamk III. I. 467, and Encyc. Meth. III. 16; Roem. & Schult. Syst. IV. 240; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 87, and Flor. Ind. I. 497. *I. Roxburghii*, Steud. Nomencl. ed. II. 1, 819. *I. noctiflora*, Griff. Not. IV. 286.

PENANG: cultivated, Hallier. SINGAPORE: S. Mayer 211.—DISTRIB. Throughout the tropics; possibly not truly wild in our area.

#### 17. ARGYREIA, Lour.

Climbing rarely sub-erect shrubs. *Leaves* cordate to lanceolate, pubescent or silky. *Flowers* axillary, usually in many-flowered cymes, often sub-capitate; bracts often conspicuous. *Sepals* 5, herbaceous in flower; in fruit leathery but little enlarged; often red within. *Corolla* funnel-shaped, rose-purple, tube more or less hirsute externally; limb plicate, shortly 5-lobed. *Stamens* 5, included; anthers oblong, straight. *Disk* annular. *Ovary* 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a hard dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 30, in the tropics of the Old World chiefly, and mostly in S.E. Asia and Polynesia.

ARGYREIA OBTUSIFOLIA, Lour. Flor. Cochinchin. 135. A large climber. *Leaves* elliptic or oblong, acute or obtuse, with or without a sub-mucronate tip, base cuneate or occasionally rounded, upper surface pilose, under surface silky strigose, nerves 9 to 11 pairs, often rather distinct beneath, very oblique even in wide-leaved plants; length 5 in., breadth 1.5 to 3 in.; petiole .6 to .8 in., very rarely 1 to 1.5 in. long. *Flowers* axillary; peduncles usually short, .6 to 1 in., but occasionally 1.5 to 3 in. long; cymes sub-capitate, the pedicels .1 to .2 in. long; bracts ovate, .15 to .2 in. long, caducous. *Sepals* 5, ovate-obtuse, .25 in. long, densely silky-strigose externally, sub-patent in fruit, pale red within. *Corolla* 1.5 in. long, tubular-campanulate, densely uniformly hirsute externally. *Capsule* .4 in. in diam., globose, pericarp chartaceous, pink. *Seeds* finely grey-velvety, hemispheric, .2 in. in diam. Choisy in DC. Prod. IX. 333. *Convolvulus obtectus*, Wall. Cat. 1416. *Rivea? obtecta*, Choisy, Convolv. Or. 28, and in DC. Prod. IX. 326. *Argyreia Championi*, Benth. Fl. Hongkong, 236. *A. obtecta*, Clarke in Hook. f. Flor. Brit. Ind. IV. 186. *Lettsomia Championi*, Benth. & Hook. f. Gen. Pl. II. 869.

PERAK: Scortechini 1884! KEDAH: Langkawi, Curtis 2852!—



DISTRIB. Indo-China, from the Andamans and Tenasserim to Cochin China, Hongkong.

The two varieties distinguished in the *Flora of British India* can no longer be maintained in view of the large suites of specimens reported of late years from the Andamans, where the species is exceedingly common.

# 18. LETTSOMIA, Roxb.

Scandent, more or less hirsute or strigose shrubs. *Leaves* cordate rounded or truncate. *Flowers* in axillary, peduncled, corymbose or capitate cymes; bracts conspicuous. *Sepals* 5, orbicular or elliptic; somewhat thickened and coriaceous in fruit. *Corolla* usually pink; tube infundibuliform-campanulate; limb plicate, very shortly 5-lobed. *Stamens* 5, exserted or included; anthers oblong or linear, straight. *Disk* annular or cupular. *Ovary* 2-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 40, in tropical Africa and S.E. Asia.

There is not, as the writer has already explained (*Journ. As. Soc. Beng.* LXIII. 2, 91), any very good reason for retaining *Lettsomia* as a genus apart from *Argyreia*. In *Argyreia* the ovary is completely 4-celled; in *Lettsomia* it is 2-celled, but not infrequently a partial dissepiment of smaller or larger size is to be found at the base of, sometimes half-way up, the cell.

Capsule chartaceous; seeds usually 4, only casually fewer; leaves cordate, softly hairy; cymes capitate; bracts large, elliptic-oblong, sub-persistent .. ..

1. *L. peguensis*.

Capsule coriaceous or sometimes somewhat fleshy; seeds usually 1, only casually 2:—

Cymes compact; bracts large, persistent:—

Cymes capitate, globose; bracts purple, large, orbicular-obtuse; leaves ovate-lanceolate, sparingly adpressed-hirsute

2. *L. sphaerocephala*.

Cymes sub-capitate, hardly globose; bracts ovate or ovate-lanceolate, acute; leaves ovate or elliptic, base rounded or shortly cuneate:—

Corolla 2·25 in. long; leaves chartaceous, glabrous and shining above, a few hairs on petiole and midrib beneath .. ..

3. *L. Maingayi*.

Corolla 1·25 in. long; leaves firmer, glabrous not shining above, hirsute beneath:—

Leaves hirsute, more especially on the nerves, beneath; petioles sparingly hairy .. ..

4. *L. Ridleyi*.

Leaves densely hirsute beneath throughout; petioles densely hairy .. ..

4a. *L. Ridleyi*,  
VAR. *velutina*.

Cymes lax; bracts small, rarely with a casual foliaceous bract in a cyme, and usually caducous:—

Sepals narrowly lanceolate, acute, spreading or sub-reflexed in fruit; bracts lanceolate, occasionally one large and leaf-like; leaves elliptic, softly hairy on both surfaces .. ..

5. *L. adpressa*.

Sepals ovate or orbicular, obtuse or rarely some of them emarginate; bracts minute, usually caducous; leaves glabrous above:—

Sepals irregular, the three outer entire rounded, sparingly hairy, the two inner wider deeply emarginate, all closely embracing the base of the fruit; leaves elliptic shortly acuminate, sparingly adpressed-pubescent beneath .. .. . 6. *L. Curtisii*.

Sepals regular or nearly so, all entire:—

Corolla 1·5 to 1·75 in. long:—

Sepals sub-equal, at length almost glabrous and somewhat spreading in fruit; leaves elliptic-oblong, chartaceous, glabrous or very sparingly pubescent beneath .. .. . 7. *L. penangiana*.

Sepals persistently adpressed grey-pubescent outside, the inner rather larger than the outer, closely embracing the base of the fruit; leaves ovate-acute, firm, sparsely hirsute with rusty hairs beneath .. 8. *L. Scortechinii*.

Corolla ·5 to ·75 in. long; leaves elliptic acuminate; sepals closely embracing the base of the fruit:—

Leaves densely tawny-tomentose beneath; sepals all softly tawny-velvety, the inner rather the smaller; corolla ·75 in. long .. .. . 9. *L. rubicunda*.

Leaves sparingly strigose-hirsute beneath; sepals sub-equal, the outer pubescent, the inner at length almost glabrous .. .. . 10. *L. Kunstleri*.

1. *LETTSOMIA PEGUENSIS*, Clarke in Hook. f. Flor. Brit. Ind. IV. 193. A large climber, sometimes 50 feet long, with villous stems and branches. *Leaves* ovate, ovate-lanceolate or sub-orbicular, apex acute, base cordate; both surfaces densely softly hairy, tomentum fulvous but not acicular; length 4 to 6 in., width 1·5 to 3·5, rarely 5 to 6 in.; petiole 1·5 to 4 in. long. *Flowers* in axillary capitate cymes; peduncles 5 to 9 in. long; bracts sub-persistent, densely softly hairy, elliptic-oblong, 1 in. long. *Sepals* 5, the outer elliptic acute, rather larger than the inner lanceolate, densely hispid; ·5 to ·7 in. long. *Corolla* infundibuliform-campanulate, softly sparsely hairy externally, 2 in. long; limb and upper two-thirds of tube bright pink, base of tube nearly or quite white. *Berry* when ripe glossy brown, sub-globose, thin-walled, ·25 in. across. *Seeds* usually 2 or 4. Prain Journ. As. Soc. Beng. LXIII. 2, 94. *L. strigosa*, Roxb. Hort. Beng. 13, ex Wall. Cat. sub. n. 1404. *L. capitata*, Miq. Flor. Ind. Bat. II. 591. *Argyreia capitata*, Choisy in DC. Prod. IX. 332, partly and excluding var. *β. conferta*: Kurz For. Flor. Burm. II. 216 mainly. *Convolvulus strigosus*, Wall. Cat. 1365/2, 1365/c, and 1365/e partly. *C. barbiger*, Wall. Cat. 1404/1, 1404/2 in part. *Argyreia barbiger*a, Choisy Convolv. Or. 42, and in DC. Prod. IX. 332.

PERAK : Batu Kuran, *Scortechini* 1628! near Goping, *King's Collector* 1077! Larut, *King's Collector* 2622! near Ulu Kerling, *King's Collector* 8627! PENANG : Bateh Pulo, *Deschamps*! SELANGOR : Woods at Gua Batu, *Ridley* 8210! 8227! 10194!—DISTRIB. Burma, Tenasserim, Sumatra, Java.

Probably only a geographical form of *Lettsomia strigosa*, Roxb., which is widespread in Indo-China and extends to S. China.

2. LETTSOMIA SPHÆROCEPHALA, Prain Journ. As. Soc. Beng. LXXIII. 2, 19. A shrubby climber; branches irregularly angled, with ridged bark brownish on young shoots, pale straw-coloured on older twigs, sparingly beset with adpressed acicular hairs. *Leaves* ovate-lanceolate, apex acute, base rounded, purplish beneath, very sparingly beset on both surfaces with adpressed hairs; length 4 to 5 in., width 1·5 to 2 in.; petiole 1 to 1·25 in., sparsely pubescent above with adpressed hairs. *Flowers* in compact capitate globose cymes 1·5 to 2 in. across, on long slender peduncles 2 to 12 in. long, sparingly adpressed-pubescent, surrounded by large orbicular purple involuerant sessile bracts 1·5 in. across, sparsely hirsute externally, quite glabrous internally, the individual flowers enveloped in similar but smaller sub-orbicular to spatulate bracteoles ·5 in. long, ·25 to ·5 in. wide; pedicels short adpressed-setose. *Sepals* glabrous externally except at their setose apices, the outer sub-acute, the inner wider obtuse ·25 in. long. *Corolla* ·75 to 1 in. long, infundibuliform-campanulate, pink, softly adpressed-hirsute externally. *Berry* not seen. *Argyreia sphærocephala*, Prain MSS.

PERAK : Krian, Abu Salama, Gunong Haran Ryah, *Scortechini*!

A very striking and remarkable species. The corollas do not appear to be full-sized. *Scortechini*, on the ticket of his Gunong Haran Ryah specimens, has written "fruit from Maxwell's Hill," but unfortunately the fruiting specimens alluded to are not at Calcutta.

3. LETTSOMIA MAINGAYI, Clarke in Hook. f. Flor. Brit. Ind. IV. 195. A large slender climber; branches slender or stoutish, with spreading setulose hairs. *Leaves* ovate or elliptic, base rounded or very shortly cuneate, apex acute or shortly caudate-acuminate, papery, glabrous and shining on both surfaces except for a few hairs on the midrib beneath; length 5 to 7 in., width 3 to 4 in.; lateral nerves 5 to 7; petioles ·5 to 1 in. long, very sparsely setulose. *Flowers* in axillary few-flowered cymes 2 to 3 in. wide; peduncles ·25 to 2 in. long, rather closely hirsute with tawny spreading hairs; bracts ovate-lanceolate, 1·5 in. long, ·6 in. wide, rather strongly parallel-nerved, sparingly hirsute externally, glabrous and dark purple within; bracteoles similar but smaller, ·3 in. long. *Sepals* linear-lanceolate, long-acuminate, ·75 in.

long, beset with long setulose hairs. *Corolla* tubular-campanulate, purple with whitish folds, 2.25 in. long; hairy externally. *Stamens* with filaments glandular-hairy at the thickened base. *Berry* ellipsoid, succulent, .75 in. long, .5 in. wide. *Seed* solitary.

MALACCA: *Griffith, Maingay, Derry* 318! *Goodenough* 1432! PERAK: *Scortechini* 297!

A very distinct species. There is no fruiting specimen in Herb. Calcutta; the above description of the berry is taken from the *Flora of British India*.

4. *LETTSOMIA RIDLEYI*, Prain Journ. As. Soc. Beng. LXIII. 2, 93. A large climber; branches sparingly hirsute. *Leaves* elliptic-acuminate, quite glabrous above, hirsute especially on the nerves beneath; 5.5 in. long, 3.5 in. wide; petiole 1 to 3 in. long, sparsely hirsute. *Flowers* in compact sub-capitate 8-10-flowered cymes 1.5 in. across, surrounded by large ovate-acute sessile foliaceous persistent bracts hirsute below, quite glabrous above, .8 in. long, .25 in. wide; bracteoles similar but smaller, .3 in. long; peduncles 2 to 6 in. long, hirsute. *Sepals* sub-equal, ovate-lanceolate, externally pubescent, .3 in. long. *Corolla* pink, infundibuliform-campanulate, 1.25 in. long, tube hirsute externally. *Berry* ovoid, .5 in. long, .3 in. in diam., the sepals spreading from its base.

JOHORE: Kota Tinggi, *Ridley* 4214! Chin-chin, *Lake & Kelsall*! SINGAPORE: Bukit Mandai, *Ridley*!

VAR. *velutina*, Prain l.c. *Leaves* beneath densely hirsute, as are the petioles, pedicels, and bracts externally.

SINGAPORE: Bukit Mandai, *Ridley*!

Nearest to *L. spherocephala*, but distinguished by the acute bracts and bracteoles, and to *L. Maingayi*, from which it differs by the smaller flowers and shorter bracts and sepals. VAR. *velutina* in foliage and tomentum remarkably resembles *L. rubicunda*, but the acute sepals and large persistent bracts and bracteoles amply distinguish it.

5. *LETTSOMIA ADPRESSA*, Miq. Flor. Ind. Bat. II. 591. A scandent shrub; branches hirsute; stems 10 to 30 feet long. *Leaves* elliptic, softly hirsute on both surfaces; base rounded or cuneate, apex acute; length 4 to 5 in.; width 2 to 2.5 in.; petiole 1.5 in. long, softly hirsute. *Flowers* in axillary few-flowered, somewhat open cymes 2 in. across; peduncles .5 to 1.5 in. long, hirsute; bracts lanceolate, hirsute, .3 in. long, .15 in. wide, with an occasional longer leaf-like bract; bracteoles small. *Sepals* .3 to .5 in. long, narrowly lanceolate, sparingly hirsute, spreading or sub-reflexed in fruit. *Corolla* tubular-campanulate, dull claret, or pale pink and white, or white with claret stripes, externally hairy; tube 1.25 in. long. *Berry* ellipsoid, .5 in. long, .3 in. wide, at first green with a reddish tint, becoming bright pink, and at length, when quite ripe, reddish-brown. Clarke in Hook. f. Flor. Brit. Ind. IV. 196.



*Convolvulus adpressus*, Wall. Cat. 1424. *Moorcroftia adpressa*, Choisy Convolv. Or. 49, and in DC. Prod. IX. 334.

PENANG: Porter! Kunstler 1324! 5271! Curtis 318! MALACCA: Maingay! PERAK: Scortechini 1280! King's Collector 2457! 5400! Wray 1914! 3298! 3961!

6. LETTSOMIA CURTISH, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A climber with brown glabrous branches. Leaves elliptic, shortly acuminate, glabrous except for a few hairs on the midrib above, sparingly adpressed-hirsute beneath; length 4 to 5 in., width 2.5 to 3 in.; petiole 2 to 3 in. long, glabrous. Flowers in axillary compound sub-umbellate cymes, 3 in. wide, 12-16-flowered; peduncles 4 to 10 in. long, brown, glabrous; bracts deciduous. Sepals coriaceous, .25 in. long, the three outer sparingly hirsute, rounded, entire, the two inner wider, deeply emarginate, glabrous. Corolla not seen. Berry ovoid, succulent, .75 in. long, .5 in. wide, lower third closely embraced by the sepals.

SELANGOR: Kwala Lampar, Curtis 2158!

A very distinct species, easily differentiated by its emarginate inner sepals.

7. LETTSOMIA PENANGIANA, Miq. Flor. Ind. Bat. III. 592. A climber with very slender stems sometimes 100 feet long, young branches thin, fulvous-tomentose, soon becoming glabrous. Leaves elliptic-oblong, base rounded or cuneate, apex acute or sub-acute, papery, medium green glabrous above, very light green and glabrous or sparingly adpressed-pubescent and more closely hairy on the midrib beneath; 6 in. long, 2.5 in. wide; petiole .5 to 1 in., glabrous. Flowers in lax axillary cymes 2 to 3 in. across, the terminal flower usually longer than the others; peduncles slender, 2 to 6 in. long, very sparsely hirsute, soon glabrous; pedicels .3 to .7 in. long, slender, hirsute; bracts minute. Sepals ovate-obtuse, sparingly hairy and at length glabrescent, .2 in. long, at length spreading or sub-reflexed. Corolla tubular-campanulate, externally hirsute, bright claret or purple within, paler without, 1.5 to 1.75 in. long. Berry ovoid, .6 in. long, .3 in. wide, rose-pink, reddish-blue, or purple. Clarke in Hook. f. Flor. Brit. Ind. IV. 196; Prain Journ. As. Soc. Beng. LXIII. 2, 99. *Convolvulus penangianus*, Wall. Cat. 1425. *Moorcroftia penangiana*, Choisy Convolv. Or. 50, t. 4., and in DC. Prod. IX. 335.

PENANG: Porter! Curtis 1586! PERAK: very common; Scortechini 1147! Wray 2061! 2095! 2334! 2733! Curtis 2034! Derry! King's Collector 1936! 2048! 2574! 3223! 5339!

VAR. *reticulata*, Prain Journ. As. Soc. Beng. LXIII. 2, 100. Leaves thicker, secondary nerves beneath very distinct.

PERAK: Larut, King's Collector 8544!

The leaves of this species are very characteristically glandular-punctate beneath. The peduncles and pedicels of var. *reticulata* are rather shorter than in the type and the corolla, described by Kunstler as "waxy white, pale blue inside," is only two-thirds the length and only half the width of that of *L. penangiana* proper. But the leaves have the same characteristic glandular punctulation and are similarly sparingly adpressed-pubescent beneath, while the fruit, described by Kunstler as a rich pink, is indistinguishable from that of *L. penangiana*. This form, therefore, though very distinct, cannot yet be more than varietally separated.

8. LETTSOMIA SCORTECHINII, Prain Journ. As. Soc. Beng. LXIII. 2, 98. A strong climber; stems rusty-brown, very sparingly pubescent. *Leaves* ovate-acute, base rounded, firmly sub-coriaceous, very sparsely hirsute with scattered rusty hairs beneath, glabrous above; length 2 to 3 in., width 1 to 2 in.; petiole .5 to 1 in., minutely sparingly rusty-pubescent. *Flowers* in open 3-8-flowered corymbose cymes 1 to 1.5 in. across; peduncles minutely sparingly rusty-pubescent, 2 to 5 in. long; bracts caducous. *Sepals* orbicular, minutely adpressed-grey-tomentose externally, in flower .25 in., in fruit .3 in. across, the inner larger than the outer. *Corolla* 1.5 in. long, infundibuliform-campanulate, pink, densely adpressed-fulvous-tomentose on tube and bands of limb externally. *Berry* sub-spherical to ellipsoid, .5 in. wide, .5 to .75 in. long, the base closely embraced by the sepals.

PERAK: Canfield's Hill, 4,000 feet, *Scortechini* 381! Birch's Hill, *Ridley* 10681! Maxwell's Hill, *Ridley* 5559!

As in the case of *L. rubicunda*, one or two bracts remain on the specimens; they are small, orbicular, .2 in. across, but it does not follow that the fallen bracts were so small. The corollas on *Scortechini*'s specimens, on which the original description was based, are about .6 in. long, but subsequent material communicated by Mr. Ridley (*Ridley* 5559) shows that the flowers originally described were not fully expanded. Another of Mr. Ridley's specimens (10681) proves that the berry is not always sub-spherical. The species is obviously closely allied to *L. rubicunda*, but besides the very different degree of tomentum, *L. Scortechini* differs from *L. rubicunda* in having the inner sepals distinctly larger, instead of smaller, than the outer.

9. LETTSOMIA RUBICUNDA, Clarke in Hook. f. Flor. Brit. Ind. IV. 195. An extensive climber; stems fulvous-tomentose. *Leaves* elliptic, shortly abruptly acuminate or acute, base rounded, sub-coriaceous, densely tawny-tomentose beneath, glabrous above; length 5 to 7 in., width 2 to 4 in.; petiole tawny-tomentose, 1 to 2 in. long. *Flowers* in open many-flowered corymbose cymes, 2 to 4 in. across; peduncles tawny-tomentose, 3.5 to 7 in. long; bracts caducous. *Sepals* orbicular, obtuse, softly tawny-velvety, in flower .2 in., in fruit .3 in. across, the inner rather smaller. *Corolla* .75 in. long, infundibuliform-campanulate, pink, densely tawny-tomentose externally. *Berry* ellipsoid, obtuse,

smooth, dry, .75 in. long, .3 to .5 in. wide, the base closely embraced by the sepals. *Convolvulus rubicundus*, Wall. Cat. 1409. *Argyreia rubicunda*, Choisy Convolv. Or. 44, and in DC. Prod. IX. 333.

MALACCA: Griffith! Maingay.—DISTRIB. Burma.

The above description is taken from Griffith's Malacca plant; the writer has seen no other specimens. One or two bracts remain; they are small, .2 in. across, and orbicular, but it does not follow that the fallen bracts were so small. There is no perfect corolla on the specimens at Calcutta; the length of the tube given above is derived from Mr. C. B. Clarke's description.

10. LETTSOMIA KUNSTLERI, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A slender climber, 50 to 80 feet long, young branches densely hirsute. *Leaves* elliptic-acuminate, glabrous and shining above, sparingly strigose-hirsute beneath, especially on the nerves, occasionally the midrib above sparsely hairy; length 3.5 to 4.5 in., width 2 to 2.5 in.; petioles densely hirsute, 1 to 1.5 in. long. *Flowers* in lax axillary 12-20-flowered cymes, 2 to 3 in. across; peduncles 5 to 8 in. long, densely hirsute; bracts hirsute, 3 in. wide; pedicels hirsute, slender, .5 to .75 in. long. *Sepals* orbicular, sub-equal, the three outer pubescent, the others at length almost glabrous, .15 in. long. *Corolla* white externally, bright pink or red within, externally hirsute, tubular-campanulate, .5 in. long. *Berry* ovoid, .5 in. long, .3 in. wide, deep glossy red.

PERAK: Larut; Kota, Wray 2856! Ulu Salama, Scortechini! Goping, Chandleriang, &c., King's Collector, 732! 2307! 2726! 5672! Campon Road, Ridley 9704! SELANGOR: Batu Caves, Ridley 8220!—DISTRIB. Sumatra.

## Order LXXXII. SOLANACEÆ.

[By D. PRAIN.]

Herbs or shrubs, sometimes becoming small soft-wooded trees. *Leaves* alternate or at times in unequal pairs, rarely clustered, never truly opposite, entire, lobed or pinnate; stipules 0. *Inflorescence* of terminal or oftener lateral axillary or extra-axillary cymes, or of solitary or clustered pedicels, without bracts or bracteoles. *Flowers* regular, hermaphrodite. *Calyx* inferior, gamosepalous, lobes or teeth usually 5, rare 4 or 6 to 10; usually persistent, sometimes enlarged in fruit. *Corolla* gamosepalous 5-lobed or rarely (*Datura*) 10-lobed or with limb sub-entire; narrow-campanulate to rotate. *Stamens* 5, epipetalous; anthers oblong or narrow-ovate; cells parallel, dehiscing by apical pores or longitudinally. *Ovary* 2-celled or imperfectly

1-celled by abortion, or 4-celled by subsequent development of accessory dissepiments; style linear; stigma capitate or shortly lobed; ovules indefinite, on peltate intruded placentas. *Fruit* indehiscent, berry-like or capsular and opening by valvular or circumscissile dehiscence; usually 2-celled, rarely 4-celled, many-seeded. *Seeds* compressed, disc-like or sub-reniform with embryo peripheric; occasionally (*Nicotiana*) hardly compressed and with embryo straight.—**DISTRIB.** Species about 1,300, throughout tropical and sub-tropical countries.

Fruits berry-like, 2-celled, indehiscent; seeds compressed and embedded in pulp:—

Anthers opening by 2 small pores at the tips; fruits globular (in *S. Melongena* sometimes elongated) .. .. 1. SOLANUM.

Anthers dehiscing throughout longitudinally:—

Calyx in fruit small, fruits usually elongated .. .. 2. CAPSICUM.

Calyx in fruit enlarging and enveloping the globose berry .. .. 3. PHYSALIS.

Fruits capsular:—

Capsules 4-celled and 4-valved, or sometimes hardly dehiscing; seeds compressed; flowers solitary .. .. 4. DATURA.

Capsules 2-celled, dehiscing freely; seeds hardly compressed; flowers in panicles .. .. 5. NICOTIANA.

### 1. SOLANUM, Linn.

Armed or unarmed herbs, shrubs, or small trees. *Leaves* alternate or sub-opposed in unequal pairs, entire, lobed or pinnatifid. *Cymes* dichotomous or racemose, lateral or terminal. *Calyx* usually 5-lobed, rarely 10-lobed or sub-entire, sometimes enlarging in fruit. *Corolla*-tube short, rotate or very shortly campanulate; limb 5-lobed, plicate in bud. *Stamens* 5, with short filaments, adnate to throat of corolla; anthers oblong, narrowed upwards so that the two cells form a cone opening at the tip by terminal pores. *Ovary* 2-celled (in cultivated forms sometimes 3-4-celled); style columnar, stigma small. *Fruit* berry-like but with calyx at base, rarely overtopping it, globose or (rarely) elongated. *Seeds* very numerous, disk-like; embryo peripheric.—**DISTRIB.** Species 750, mostly tropical American, but spread throughout all tropical and sub-tropical regions.

Unarmed herbs or shrubs:—

Flowers in extra-axillary peduncled cymes or racemes:—

Leaves glabrous or sparingly pubescent; cymes sub-umbellate; calyx-teeth obtuse, 5; corolla and ovary glabrous; berry red or black, rarely yellow .. .. 1. *S. nigrum*.

Leaves densely stellately woolly; cymes corymbose; calyx-teeth triangular, 5; corolla and ovary hairy; berry yellow .. .. 2. *S. verbascifolium*.

Flowers axillary, pedicels fascicled or solitary; corolla glabrous:—



- Calyx with a sub-entire margin; flowers white; leaves glabrous; epiphytic .. .. 3. *S. parasiticum*.
- Calyx with a distinctly 10-toothed margin; terrestrial:—
- Leaves glabrous; calyx with 5 long teeth and 5 very short intermediate toothlets; corolla-lobes purplish; berry dark blue .. .. 4. *S. Blumei*.
- Leaves usually puberulous to pubescent, rarely almost glabrous; calyx with 10 long teeth; corolla white; berry yellow .. .. 5. *S. biflorum*.
- Armed herbs with prickly stems and usually prickly leaves; corolla pubescent externally:—
- Densely stellate-tomentose throughout:—
- Calyx not overtopping the berry; erect herbs or shrubs:—
- Flowers white:—
- Leaves very prickly especially on the nerves beneath; ovary hirsute; fruit hispid with acicular hairs .. 6. *S. ferox*.
- Leaves with very few prickles; ovary and fruit glabrous .. .. 7. *S. torvum*.
- Flowers blue:—
- Racemes many-flowered; berry small, yellow, globose .. 8. *S. indicum*.
- Racemes few-flowered; berry large, purple, rarely white or yellow, often in cultivation ellipsoid or elongate .. 9. *S. Melongena*.
- Calyx overtopping the berry; a spreading shrub .. 10. *S. sarmentosum*.
- Thinly beset with minute hairs; berry large, smooth; calyx very prickly .. .. 11. *S. aculeatissimum*.

1. *SOLANUM NIGRUM*, Linn. Sp. Pl. 186. A herb or undershrub, 1 to 3 feet high; all parts sparingly pubescent or glabrous. *Leaves* petioled, membranous, ovate or oblong, narrowed towards apex and base, sinuate-toothed or -lobed; 3 to 4 in. long, 2 in. across; green on both surfaces; petioles .75 in. long. *Flowers* small, sub-umbellately clustered on stoutish extra-axillary peduncles .35 to .75 in. long; pedicels 5 to 8 together, slender, .35 in. long. *Calyx* sparsely puberulous, 5-toothed; teeth small, ovate-oblong, .05 in. long, in fruit hardly noticeable. *Corolla* white, rarely purplish, externally glabrous, .5 in. wide, rotate, 5-lobed. *Ovary* glabrous; style hairy at base. *Fruit* red or black, rarely yellow, globose, .25 in. across, supported by the saucer-shaped calyx. *Seeds* .05 in. in diam., almost smooth. Bl. Bijdr. 694; Dun. in DC. Prod. XIII. 150; Miq. Flor. Ind. Bat. II. 636; Kurz For. Flor. Burm. II. 224; Clarke in Hook. f. Fl. Br. Ind. IV. 229. *S. rubrum*, Roxb. Flor. Ind. I. 565. *S. triangulare*, Lamk III. II. 18. *S. uliginosum*, Bl. Bijdr. 695. *S. Rumphii*, Dun. in DC. Prod. XIII. 57. *S. rhinocerotis*, Bl. Bijdr. 695.

SINGAPORE: Ridley 8084! PERAK: Kota Bahru, King's Collector 566! ANDAMANS: King's Collectors! NICOBARS: Kurz!—DISTRIB. Tropics generally.

2. *SOLANUM VERBASCIFOLIUM*, Linn. Sp. Pl. 184. An erect unarmed shrub, 8 to 20 feet high; all parts thickly stellate-tomentose, the

omentum often scurfy. *Leaves* petioled, thickly herbaceous, ovate-lanceolate to lanceolate, acute; base usually truncate or rounded, rarely cuneate; 4 to 7 in. long, 3 in. across; green above, white to yellowish-brown beneath from the scurfy tomentum; petioles .5 to 1.5 in. long. *Flowers* small, on thick tomentose pedicels, densely clustered in a small tomentose corymb-like cyme on an erect sub-terminal stout peduncle 1 to 3 in. long. *Calyx* densely tomentose, 5-toothed; teeth triangular, acute, .1 in. long in flower. .3 in. long in fruit; tube short. *Corolla* white, externally stellate-tomentose, .6 in. across, rotate, 5-lobed; lobes short, ovate-oblong. *Ovary* hairy; style glabrous. *Fruit* yellow, globose, .4 in. wide, the lower portion embraced by the calyx-lobes. *Seeds* .12 in. in diam., minutely dotted. Dun. in DC. Prod. XIII. 114; Lour. Flor. Cochinchin. 128; Wall. Cat. 2616; Kurz For. Flor. II. 225; Clarke in Hook. f. Flor. Brit. Ind. IV. 230; Miq. Flor. Ind. Bat. II. 640. *S. pubescens*, Bl. Bijdr. 698; Roxb. Flor. Ind. ed. Carey & Wall. II. 244 (not of Willd.).

SELANGOR: Kwala Lampar, *Goodenough*! PERAK: *King's Collector* 2069! 7177! Wray 2357! PENANG: *Deschamps*! KEDAH: *King's Collector* 1704! NICOBARS: Kamorta, *Jelinek*! Teressa, *King's Collectors*!—DISTRIB. Tropics of both hemispheres.

3. SOLANUM PARASITICUM, Bl. Bijdr. 697. An erect almost glabrous epiphytic shrub, 2 to 4 feet high. *Leaves* short-petioled, rather firmly membranous, lanceolate-acuminate, narrowed towards apex and base, entire; 6 to 8 in. long, 1.5 to 2 in. wide; green on both surfaces, minutely setulose above when young, glabrous beneath; petiole .25 to .35 in. long. *Flowers* small, clustered in an axillary fascicle of 2 to 7 together or sometimes solitary, on slender somewhat rigid glabrous pedicels .6 to .8 in. long. *Calyx* glabrous, small, the margin in flower sinuate representing either 5 or 10 teeth at most only .1 in. long; in fruit slightly enlarged, saucer-shaped, the margin quite entire. *Corolla* white, glabrous externally, 5-lobed, rotate; .25 in. across. *Ovary* and style glabrous. *Fruit* yellow, globose, .25 in. in diam., resting on the saucer-shaped calyx. *Seeds* .06 in. in diam., smooth. Nees Trans. Linn. Soc. XVII. 45; Miq. Flor. Ind. Bat. II. 641.

PERAK: Larut, on trees, rather plentiful, Wray! *Scortechini*! *King's Collector*!—DISTRIB. Sumatra, Java.

Near *S. subtruncatum* but always epiphytic, and with an even more markedly truncate calyx-limb than in that species.

4. SOLANUM BLUMBI Nees ex Bl. in Bijdr. 696. An erect quite glabrous shrub, 3 to 4 feet high, with spreading branches. *Leaves* towards top in pairs from one node, usually one smaller, elliptic-acuminate at both ends, bases unequal; 4 to 6 in. long, 2 to 3 in. wide;

rather firmly membranous; lateral nerves 6 to 7 pairs; petiole .3 in. long. *Flowers* in clusters of 2 to 9, rarely solitary, axillary; pedicels slender, in flower deflexed, in fruit spreading, .75 in. long, thickened upwards. *Calyx* glabrous, limb sub-truncate with 5 subulate, and 5 intervening minute teeth, the longer series .2 to .25 in. long. *Corolla* with white tube and 5 purplish narrow-ovate lobes, .3 in. across. *Ovary* and style glabrous. *Fruit* globose, dark blue, .25 in. in diam., resting on the saucer-shaped calyx with persisting teeth. *Seeds* .09 in. in diam., almost smooth. Nees Trans. Linn. Soc. XVII. 45; Dun. in DC. Prod. XIII. 180; Miq. Flor. Ind. Bat. II. 642.

SELANGOR: *Ridley*! PERAK: Larut, *King's Collector*! Wray! Curtis! *Ridley*! *Scortechini*! Gunong Panti, *Kunstler*!—DISTRIB. Sumatra, Java, Borneo.

The commonest *Solanum* of its group in our area. It has been suggested by Clarke that there is little to separate this form specifically from *S. subtruncatum*; this is true, but there seems equally little to separate it specifically from *S. biflorum*. Its glabrous condition, however, at once distinguishes it from both as, if not a species, at least a very marked form.

5. *SOLANUM BIFLORUM*, Lour. Flor. Cochinchina. 129. An erect more or less pubescent shrub, 3 to 6 feet high; the young shoots often flocculose. *Leaves* membranous, elliptic or oblong, acuminate, base narrow-cuneate, entire; 3 to 5 in. long, 1.5 to 1.75 in. wide; green on both sides, setulose-pubescent, rarely glabrescent with age; petiole .7 in. long. *Flowers* small, clustered in axillary fascicles of 2 to 6 together, or solitary; pedicels slender, .65 in. long. *Calyx* setulose-pubescent, the margin usually 10-toothed rarely 7-9-toothed; teeth narrowly lanceolate, setulose, .15 in. long. *Corolla* white, externally glabrous, rotate, 5-lobed, .25 in. across. *Ovary* and style glabrous. *Fruit* globose, yellow, .25 in. in diam., resting on the saucer-shaped calyx with persisting teeth. *Seeds* .1 in. in diam., almost smooth. Dun. in DC. Prod. XIII. 178; Kurz For. Flor. Burm. II. 224; Clarke in Hook. f. Flor. Brit. Ind. IV. 232. *S. decemdentatum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 565; Wall. Cat. 2614; Miq. Flor. Ind. Bat. II. 643. *S. mollissimum*, Bl. Bijdr. 698. *S. decemfidum*, Nees Trans. Linn. Soc. XVII. 43. *S. Zollingeri*, Dun. in DC. Prod. XIII. 176.

MALACCA: *Griffith*! SINGAPORE: *Wallich* (fide Clarke).—DISTRIB. Throughout Indo-China and the Malay Archipelago.

Though so plentiful in the countries both south and north of the Malay Peninsula, this seems very rare in our area where *S. Blumei* appears to replace it.

6. *SOLANUM FEROX*, Linn. Sp. Pl. ed. II. 267. An erect prickly shrub, 3 to 10 feet high, with a short soft-wooded trunk 2 to 3 in. thick;

all the younger parts thickly covered with a brownish soft tomentum intermixed with many sharp compressed brownish prickles of unequal size. *Leaves* usually sub-opposite, membranous, ovate to nearly orbicular with irregular short triangular acute or blunt lobes; 5 to 9 in. long, 3 to 6 in. wide, the lobes often 1 in. deep; green above, brownish from the tawny tomentum beneath, sparingly beset on midrib and nerves with long compressed prickles; petioles .5 to 2.5 in. long, prickly. *Flowers* large, on thickish pedicels clustered in few-flowered sub-umbellate short-peduncled racemes set close below the leaves; peduncles and pedicels densely stellate-tomentose and beset with long acicular hairs. *Calyx* shortly funnel-shaped, densely hirsute, sometimes prickly; lobes ovate-acute, .25 in. long. *Corolla* white, densely tomentose externally, nearly 1 in. across; lobes oblong-acute. *Ovary* hairy. *Fruit* yellow, globose, 1 in. in diam., hispid with acicular hairs, much exceeding the hardly altered calyx. *Seeds* .12 in. in diam., very slightly scrobiculate. Dun. in DC. Prod. XIII. 255; Kurz For. Fl. Burm. II. 226 (excl. var.  $\beta$ ); Miq. Flor. Ind. Bat. II. 646; Clarke in Hook. f. Flor. Brit. Ind. IV. 233. *S. lasiocarpum*, Bl. Bijdr. 701; Wall. Cat. 2623; Dun. in DC. Prod. XIII. 252. *S. hirsutum*, Roxb. Hort. Beng. 17, and Fl. Ind. ed. Carey & Wall. II. 253. *S. stramonifolium*, Dun. in DC. Prod. XIII. 252 (not of Jacq., nor of Wall., nor of Roxb.).

PENANG: Wallich! PERAK: Sungah Ryah, *Kunstler* 1022! Gunong Mesah, *King's Collector* 1026! SINGAPORE: Wallich! ANDAMANS: Port Blair, plentiful. NICOBARS: Nancowry, *King's Collector*!—DISTRIB. India, Indo-China, S. China, Sumatra, Java.

7. SOLANUM TORVUM, Sw. Prod. Veg. Ind. Occ. 47. An erect sparingly armed shrubby perennial, 3 to 6, or at times even 8 to 12 feet high; all parts shortly and sparsely stellate-pubescent, with but few compressed sharp scattered prickles. *Leaves* usually sub-opposite, membranous, ovate, shortly acuminate, sinuate or lobed, the lobes obtuse or acute, the base truncate very unequal; 2 to 4 in. long, 1.5 to 3 in. across; rather sparingly pubescent above, more closely sometimes scurfily pubescent beneath; petioles .5 to 1 in. long. *Flowers* medium, in lateral usually extra-axillary corymbose cymes with short pubescent peduncles; pedicels slender, .3 to .4 in. long, pubescent. *Calyx* sparsely pubescent, 5-toothed, .25 in. long, without prickles, the teeth ovate-lanceolate acute, .1 in. long, not enlarging in fruit. *Corolla* white, externally stellate-pubescent, .5 in. across, rotate, 5-lobed, the lobes .3 in. long, lanceolate-acuminate. *Ovary* glabrous. *Fruit* yellow, supported by the calyx which becomes glabrous in fruit, globular, .4 in. across. *Seeds* .2 in. in diam., compressed, minutely granular. Dun. in DC. Prod. XIII. 260; Wight Ic. t. 345; Miq. Flor. Ind. Bat. II.



648; Clarke in Hook. f. Flor. Brit. Ind. IV. 234. *S. stramonifolium*, Roxb. Flor. Ind. I. 572.

PENANG: Wallich! Deschamps! Ridley! MALACCA: Griffith! PERAK: King's Collector 1085! Scortechini 60! SINGAPORE: Schomburgk! Hullett! Kunstler 99! Ridley! ANDAMANS: very common.—DISTRIB. Malayan Archipelago, Indo-China, Philippines, China, India, Tropical America.

This is often exceedingly like the next species, *S. indicum*, but is easily distinguished by its white flowers and its considerably larger fruits.

8. *SOLANUM INDICUM*, Linn. Sp. Pl. 187 partly; Nees in Trans. Linn. Soc. XVII. 55. An erect, armed, branching shrub, 4 to 8 feet high; all young parts thickly covered with a short stellate tomentum, with broad, compressed, sharp, slightly recurved prickles. Leaves membranous or thinly herbaceous, ovate, sinuately lobed, the lobes obtuse or acute, the base obliquely truncate; 1.5 to 3 in. long, 1 to 2 in. wide; above minutely tomentose, green; grey from the denser tomentum beneath; petioles .5 to 1 in. long. Flowers medium, in lateral or spuriously terminal racemes about 2.5 to 3 in. long; pedicels .2 to .3 in. long, sometimes prickly and grey stellate-pubescent, as are the peduncles. Calyx grey stellate-pubescent, 5-toothed, .25 in. long, prickly or not; the teeth lanceolate-acute, hardly enlarging in fruit. Corolla blue, externally stellate-pubescent, .5 in. across, rotate, 5-lobed, the lobes .35 in. long. Ovary glabrous. Fruit yellow or orange, small, supported by the hardly altered calyx, globose, .25 in. in diam. Seeds .15 in. in diam., minutely dotted. Lour. Flor. Cochinchin. 131; Roxb. Flor. Ind. I. 570; Wall. Cat. 2626; Wight, Ic. t. 346; Dun. in DC. Prod. XIII. 309; Miq. Flor. Ind. Bat. II. 651; Kurz For. Fl. Burm. II. 226; Clarke in Hook. f. Flor. Brit. Ind. IV. 234. *S. violaceum*, Jacq. Fragm. 82, t. 133, f. 1 (not of R. Br.). *S. cuneatum*, Moench Meth. n. 476; Poir. Suppl. III. 743. *S. canescens*, Bl. Bijdr. 701. *S. Junghuhnii*, Miq. Flor. Ind. Bat. II. 649.

PENANG: Wallich! SELANGOR: King's Collector 363! PERAK: Wray 3077! ANDAMANS: Prain!—DISTRIB. Throughout S.E. Asia.

This species often is very like *S. torvum*; it is readily distinguished by its usually, though not invariably, more numerous prickles, by its blue flowers, and its smaller fruits.

9. *SOLANUM MELONGENA*, Linn. Sp. Pl. 186. A stout erect, sparingly armed herb, 2 to 8 feet high; all the younger parts covered with a grey soft tomentum. Leaves membranous, ovate or oblong, irregularly sinuately lobed; 3 to 6 in. long, 2 to 4 in. wide; green above, stellately pubescent beneath with a few prickles on the nerves or sometimes

quite unarmed; petiole 1 in. long. *Flowers* large, on extra-axillary often paired peduncles, one peduncle with a solitary perfect flower the other with a few-flowered raceme of male flowers; peduncles stellate-tomentose, very rarely prickly. *Calyx* shortly funnel-shaped, densely pubescent; lobes oblong-acute; .25 to .35 in. long, enlarging slightly in fruit, usually armed. *Corolla* blue, externally pubescent, 1 to 1.25 in. across, 5-lobed, lobes oblong-acute, short. *Ovary* glabrous; style stellate-pubescent or at times glabrous. *Fruit* large, ovoid, obovoid, ellipsoid, or cylindric; usually dark purple, often with white spots or streaks, sometimes uniformly white or yellowish, always glabrous, sometimes as much as 6 in. long and always much longer than the calyx. *Seeds* .12 in. in diam., slightly scrobiculate. Lour. Flor. Cochinchin. 130; Roxb. Flor. Ind. I. 566; Miq. Flor. Ind. Bat. II. 653; Clarke in Hook. f. Flor. Brit. Ind. IV. 235. *S. insanum*, Roxb. Flor. Ind. I. 568. *S. undatum*, Lamk Encyc. IV. 301; Bl. Bijdr. 700. *S. longum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 567. *S. pseudo-undatum*, Bl. Bijdr. 699. *S. ovigerum*, Bl. Bijdr. 698. *S. Trongum*, Lamk Encyc. IV. 308. *S. ferox* var. *Trongum*, Kurz For. Flor. Burm. II. 226.

In all the provinces, cultivated; occasionally also as an escape from cultivation or sub-feral (e.g., at Trang, *King's Collector* 1416!)

The Egg-Plant, or Brinjal, largely cultivated in all warm countries; originally American. As an escape this species tends to become more prickly and to have 3 to 4 fruits on the peduncle, owing to the males being replaced by perfect flowers. In such cases the fruits are much smaller and often approach, or sometimes even attain a globose form.

10. SOLANUM SARMENTOSUM, Nees Trans. Linn. Soc. XVII. 58. A straggling prickly shrub with procumbent zigzag branches, 2 to 3 feet long; all parts sparsely hairy and covered with long, straight, sharp prickles. *Leaves* membranous, broadly elliptic, sub-pinnatifid, lobes obtuse, sub-glabrescent above, sparsely stellately pubescent and prickly beneath; 4 in. long, 2 in. across, the lobes .75 in. deep; green on both surfaces; petioles .6 in. long. *Flowers* large, with thickish pedicels on 1-2-flowered, extra-axillary peduncles about 1 in. long, sparsely stellate-pubescent. *Calyx* with very shortly funnel-shaped tube, lobes ovate-acuminate .2 in. long, sparsely hairy and prickly, much enlarged in fruit. *Corolla* blue, externally pubescent, .7 in. across; lobes oblong-acute. *Ovary* glabrous. *Fruit* yellow, globose, glabrous, .5 in. across, overtopped by the enlarged caudate-acuminate, adpressed, armed calyx-lobes, .75 in. long and .35 in. wide. *Seeds* .12 in. in diam., scrobiculate. Dun. in DC. Prod. XIII. 357; Clarke in Hook. f. Flor. Brit. Ind. IV. 236. *S. Melongena*, Wall. Cat. 2628 (F. only—not of Linn.). *S. Jacquini*, Miq. Flor. Ind. Bat. II. 651 (not of Willd.).

PENANG: Wallich! PERAK: Scortechini! MALACCA: Griffith.  
PAHANG: Ridley!—DISTRIB. Malay Archipelago.

11. *Solanum aculeatissimum*, Jacq. Col. I. 100. An armed slender undershrub, 2 to 3 feet high, with glabrous stems covered with very many long, straight, slender prickles. *Leaves* only on the upper part of the stems, membranous, ovate, lobed, sparsely hairy; 3 to 5 in. long. *Flowers* on 1-7-flowered peduncles, that are usually only 1-fruited; peduncles in fruit .75 in. long. *Calyx* even in fruit small, under .25 in. long, very prickly. *Fruit* globose, 1.25 in. across, smooth. *Seeds* .2 in. in diam., extremely compressed, almost winged. Jacq. Icon. I. t. 41; Clarke in Hook. f. Flor. Brit. Ind. IV. 237. *S. aculeatissimum* var.? *denudatum*, Dun. in DC. Prod. XIII. 244.

SINGAPORE: G. Thomson.

This is not in Herb. Calcutta. The above meagre description is taken from the accounts of Dunal in the *Prodromus*, and of Clarke in the *Flora of British India*. The specimen to which Clarke refers is one of the "varieties" of Dunal, not the true *S. aculeatissimum* of Jacquin, and Dunal himself was not satisfied that it is to Jacquin's species of this name that the variety should be referred. As it has not again been reported, it is possible we may have here to deal with an unusual state of some casually introduced and perhaps well-known American species.

## 2. *CAPSICUM*, Linn.

Unarmed annual or perennial, glabrous or glabrescent herbs or shrubs. *Leaves* alternate, entire or repand. *Flowers* axillary, solitary or several together. *Calyx* campanulate, minutely 5-toothed, not enlarging in fruit. *Corolla-tube* short, rotate, limb 5-lobed, valvate in bud. *Stamens* 5, adnate near base of corolla; anthers oblong, not longer than filaments, dehiscent longitudinally. *Ovary* 2-celled, rarely 3-celled; style columnar, stigma small. *Fruit* resembling a berry, but with the calyx at its base; elongated or (rarely) globose. *Seeds* very numerous, disk-like; embryo peripheric.—DISTRIB. Species 2 or more, natives of America.

The number of species is doubtful, and depends on the point of view of the reviewer with regard to the many more or less distinct forms assumed by the plants under cultivation; some writers recognise as many as 80, others claim only about 20; more recent authors insist only on 2 species—a perennial (*C. frutescens*), and an annual (*C. annuum*), both very variable. Possibly, however, there is but a single very variable species, for in the tropics the forms of *C. annuum* are often not truly annual, and in temperate regions the perennial tropical forms rarely persist for more than a season.

Pedicels solitary, variously erect or reflexed; fruits erect or spreading or pendent, at least as long as, usually longer than, the pedicels; plants annual or biennial:—

Flowers white; berries at first green, afterwards becoming red, orange or yellow:—

Fruit not globular:—

Berries tapering, much longer than broad :—

Fruit stout, flesh thick, usually mildly pungent; calyx not enclosing base of berry .. .. 1. *C. annuum*.

Fruit slender, flesh thin, keenly pungent; calyx enclosing base of berry .. .. (*annuum*,  
.. .. (VAR. *acuminata*).

Berries not much if at all longer than broad, usually obtuse ;

calyx not enclosing base of berry :—

Berries circular in section, sub-conical, ovate or oblong, flesh thin, pungent .. .. (*annuum*,  
.. .. (VAR. *abbreviata*).

Berries swollen, irregularly angled in section, prismatic, quadrate or oblate, flesh very thick, hardly at all pungent .. .. (*annuum*,  
.. .. (VAR. *grossa*).

Fruit globular, extremely pungent .. .. (*annuum*,  
.. .. (VAR. *cerasiformis*).

Flowers purple; berries at first dark-purple, afterwards becoming orange-red, much longer than broad, only slightly pungent; calyx hardly enclosing base of berry .. .. (*annuum*,  
.. .. (VAR. *nigra*).

Pedicels 2 or more, erect; fruit always erect, red, shorter than the pedicels, pungent; plants perennial; flowers always white or yellowish-white :—

Berries elongated, tapering; base embraced by the calyx .. .. 2. *C. frutescens*.

Berries globose or sub-globose; base seated on the calyx .. .. (*frutescens*,  
.. .. (VAR. *baccata*).

1. *CAPSICUM ANNUM*, Linn. Sp. Pl. 188. An erect branching or rarely simple robust herb 2 to 3 feet high, with slightly ridged branches; glabrous throughout. *Leaves* membranous, elliptic or ovate, rather long-acuminate, base long-cuneate, prolonged as a wing on upper part of petiole, margin entire; lamina 3 in. long, .75 to 1 in. wide, rarely 1.5 in. wide, green on both surfaces; petiole .25 to .6 in. long. *Flowers* white or rarely (VAR. *nigra*) purple; pedicels almost always solitary, though casually there may be more than one in a leaf-axil, always drooping in flower, in fruit rigid, slightly thickened under the enlarging calyx and variously erect, or spreading or recurved and pendent, then .75 to 1 in. long. *Calyx* glabrous, campanulate, with sinuate-dentate limb, .2 in. across; in fruit enlarging into a shallow cup embracing the lower part of fruit, or saucer-shaped with the base of the fruit resting on it, then often .5 in. across. *Corolla* rotate, .4 in. across; 5-lobed. *Ovary* glabrous. *Fruit* erect, straight, very variable in shape, colour, fleshiness and pungency. Irish Miss. Bot. Gard. Rep. IX. 65.

VAR. *typica*. Fruit much longer than broad, stout, tapering to the usually narrow apex; flesh thick, mildly pungent; berry resting on the saucer-shaped fruiting calyx; colour variable.

In gardens, occasionally, usually raised from seed imported from Europe.

This variety includes the many mild chillies which do not keep true to their characters when their seed is collected in the tropics.



VAR. *acuminata*, Fingerhuth. Fruit much longer than broad, slender, rarely straight, always tapering to an acute or sub-acute apex; flesh thin, keenly pungent; berry enclosed at the base by the cupular calyx; colour red or orange, or yellow. *C. longum*, DC. Hort. Monsp. 86; Fingerhuth, Caps. 23, t. 6, 7; Dun. in DC. Prod. XIII. 424. *C. frutescens*, Roxb. Hort. Beng. 17; Flor. Ind. I. 574; Bl. Bijdr. 704; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Cultivated in most of the provinces.

Some of the forms of this variety seem to have been evolved since the introduction of *Capsicum annuum* to the Eastern Hemisphere.

VAR. *abbreviata*, Fingerhuth. Fruit conoid, ovate or oblong, not much longer than broad, apex usually blunt; flesh thin, pungent; berry resting on the saucer-shaped fruiting calyx; colour variable. *C. annuum*, Roxb. Flor. Ind. I. 573. *C. frutescens*, Dun. in DC. Prod. I. 413. *Capo Molago*, Rheede Hort. Malab. II. 109, t. 56.

Occasionally cultivated.

VAR. *grossa*, Sendt. Fruit swollen, somewhat angular, prismatic or quadrate or oblate, obtuse, hardly longer than broad; flesh thick, hardly pungent; berry resting on the saucer-shaped fruiting calyx; colour red. *C. grossum*, Linn. Mant. 47; Willd. Sp. Pl. I. 1051; Roxb. Hort. Beng. 17; Flor. Ind. I. 574; Fingerhuth, Caps. 21; Dun. in DC. Prod. XIII. 422; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Occasionally cultivated.

VAR. *cerasiformis*, Mill. Fruit globular, red, flesh thin, very pungent. *C. cerasiforme*, Roxb. Flor. Ind. I. 574. *C. grossum*, VAR. *cerasiformis*, Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Sometimes grown in gardens by European residents.

VAR. *nigra*. Fruit much longer than broad; flesh thin, only slightly pungent; calyx hardly enclosing base of fruit; berry at first dark purple, at length becoming orange-red. *C. purpureum*, Roxb. Flor. Ind. IV. 239.

Occasionally cultivated.

2. *CAPSICUM FRUTESCENS*, Linn. Sp. Pl. 189. An erect, much-branching undershrub, 2 to 4 feet high, branches angled, the smaller ones puberulous but soon, like the leaves, becoming quite glabrous. Leaves petioled, membranous, ovate-acute, the base short-cuneate, truncate or rarely sub-cordate, the margins entire; lamina usually 2·5 to 4 in. long, 1·5 in. wide, green on both surfaces; petiole 5 to 7·5 in. long. Flowers small, white or yellowish-white; pedicels usually 2 to 3, sometimes 4 or more together in leaf-axils, never all of the same age, drooping in

flower and erect, thickened, rigid and somewhat elongated in fruit, 1 to 1.25 in. long. *Calyx* glabrous; limb truncate with 5 shortly projecting, spreading teeth .12 in. in diam. *Corolla* .2 in. in diam., rotate, 5-toothed. *Ovary* glabrous. *Fruit* erect, narrow to globose, bright red, .2 to .25 in. in diam. Irish Miss. Bot. Gard. Rep. IX. 97.

VAR. *typica*. Fruits ovate or sub-cylindric, acute, .75 in. long, .2 in. in diam. *C. frutescens*, Wall. Cat. 2642 B.C. *C. minimum*, Roxb. Hort. Beng. 17, Flor. Ind. ed. Carey & Wall. II. 261, and ed. propr. I. 574; Wall. Cat. 2641; Blanco, Flor. Filip. 133; Dun. in DC. Prod. XIII. 415; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239. *C. fastigiatum*, Bl. Bijdr. 705; Nees Trans. Linn. Soc. XVII. 64; Dun. in DC. Prod. XIII. 416; Wight Ic. t. 1617; Miq. Flor. Ind. Bat. II. 659; Benth. & Trim. Med. Pl. t. 188.

In all the provinces, cultivated and as an escape.

VAR. *baccata*, Irish l.c. 99. Fruit elliptic-obtuse or globose, .25 to .3 in. long, .25 in. in diam. *Capsicum baccatum*, Linn. Ment. 46; Ham. in Wall. Cat. 2644. *C. angustifolium*, Dun. in DC. Prod. XIII. 420.

NICOBARS: cultivated, *Jelinek* 137! 138!

### 3. *PHYSALIS*, Linn.

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Pedicels* axillary, solitary. *Calyx* campanulate, 5-partite in flower, the tube much enlarged and inflated in fruit, loosely enclosing the berry; teeth small, connivent. *Corolla* campanulate, yellow. *Stamens* 5, attached near base of corolla; anthers oblong, shorter than filaments, dehiscing longitudinally. *Ovary* 2-celled; style columnar; stigma obscurely 2-lobed. *Fruit* berry-like, globose. *Seeds* few or many, disk-like; embryo peripheric.—DISTRIB. Species about 34, mostly tropical American.

*PHYSALIS MINIMA*, Linn. A herbaceous pubescent or glabrescent annual, erect or with procumbent straggling branches, 6 to 15 in. high. *Leaves* petioled, ovate, sinuate angular or hardly lobed; 2 in. long, .75 in. wide, green on both surfaces; petioles 1 in. *Flowers* small, axillary, solitary; pedicels .25 to .5 in. *Calyx* hirsute or glabrescent; in flower .1 to .2 in., with lanceolate lobes as long as tube, in fruit .75 to 1 in., ovoid or sub-globose, 5-10-ribbed, the teeth sub-connivent and little altered. *Corolla* yellow, .25 in. across, glabrous, campanulate, 5-toothed. *Ovary* glabrous. *Fruits* yellow, globose, .5 in. across, completely enveloped by the accrescent calyx. *Seeds* very many, .1 in. in diam., discoid, reticulated, hardly scabrous.

VAR. *typica*; calyx not distinctly angled, all parts more or less pubescent. *P. minima*, Linn. Sp. Pl. 183; Nees in Trans. Linn. Soc.

XVII. 69; Roxb. Flor. Ind. I. 563; Dun. in DC. Prod. XIII. 445; Clarke in Hook. f. Flor. Brit. Ind. IV. 238; Miq. Flor. Ind. Bat. II. 664. *P. parviflora*, R. Br. Prod. 447. *P. divaricata*, Don Prod. 97. *P. villosa*, Roth Nov. Sp. 122. *P. Rothiana*, Roem. & Schult. Syst. IV. 677. *P. Hermannii*, Dun. in DC. Prod. XIII. 444.

PERAK: *Scortechini*! MALACCA: *Griffith*! ANDAMANS: common in waste places.—DISTRIB. A cosmopolitan tropical weed.

VAR. *indica*, Clarke Flor. Brit. Ind. IV. 238; calyx distinctly 5-angled, all parts nearly glabrous. *C. indica*, Lamk Encyc. Meth. II. 102; Nees in Trans. Linn. Soc. XVII. 70; Dun. in DC. Prod. XIII. 443; Miq. Flor. Ind. Bat. II. 662. *P. pseudoangulata*, Bl. Bijdr. 706; Miq. Flor. Ind. Bat. II. 663. *P. angulata*, Griff. Notul. IV. 96. *Nicandra indica*, Roem. & Schult. Syst. IV. 632.

PERAK: Kota Bahru, *Kunstler*, 568! Ipoh, *Curtis* 3190! PENANG: *Deschamps*! common. SELANGOR: *Ridley* 10548! NICOBARS: coasts, common.—DISTRIB. India generally.

The Cape Gooseberry, or Winter Cherry (*Physalis peruviana*), is cultivated in European gardens in the cold weather.

#### 4. DATURA, Linn.

Suffruticose, rank-smelling, glabrous or minutely pubescent herbs. *Leaves* large, entire, sinuate or deeply toothed. *Pedicels* solitary, flowers very large, purple or white. *Calyx* long-tubular, herbaceous, apex 5-toothed; in fruit circumscissile above the base. *Corolla* narrowly tubular-funnel-shaped; throat widened, limb plaited, entire or shortly lobed. *Stamens* attached near base of tube, filaments filiform; anthers included, linear, dehiscing longitudinally. *Ovary* 2-celled, or 4-celled by the formation of spurious dissepiments; style filiform; stigma 2-lobed. *Fruit* a capsule, ellipsoid, 4-celled, spinous, more or less completely 4-valved. *Seeds* very many, compressed, rugose; embryo peripheric.—DISTRIB. Species 10, temperate and tropical.

DATURA FASTUOSA, Linn. Syst. ed. X. 932. A coarse annual, 3 to 8 feet high, all parts glabrescent or very faintly puberulous. *Leaves* petioled, membranous, ovate, entire or deeply toothed, glabrous, green; 6 to 8 in. long, 3 to 4 in. across, base unequal; petioles 1 in. *Flowers* very large, solitary, pedicels .25 to .5 in., erect in flower, recurved in fruit. *Calyx* tubular, 2.5 to 3 in. long, .5 in. wide, lobes lanceolate, .25 in. long. *Corolla* purple or white, 7 in. long, base .5, throat 1.5, limb 3 to 5 in. in diam., shortly 5-6-toothed. *Ovary* glabrous. *Capsules* sub-globose, 4-celled, equally spinous on all sides, irregularly dehiscent

near apex, supported by the persistent base of calyx; 1.25 to 1.5 in. in diam. *Seeds* .25 in. diam.

VAR. *typica*; corolla purple. *D. fastuosa*, Linn. Syst. ed. X. 932; Roxb. Flor. Ind. I. 561; Wall. Cat. 2638; Nees in Trans. Linn. Soc. XVII. 74; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 669; Clarke in Hook. f. Flor. Brit. Ind. IV. 242. *D. Hummattu*, Bernh. in Linn. Litteraturber. (1883) 141.

VAR. *alba*, Clarke in Flor. Brit. Ind. IV. 243; corolla white or cream-coloured. *D. alba*, Nees in Trans. Linn. Soc. XVII. 73; Wight Ic. t. 852; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 667. *D. Metel*, Roxb. Flor. Ind. I. 561; Wall. Cat. 2639 (not of Linn.).

PERAK: Larut, *Scortechini*! Ulu Bubong, *King's Collector*! SINGAPORE: *Hullett*!—DISTRIB. Tropical Africa, S.E. Asia.

The purple-flowered variety has not been sent to Calcutta from any of the provinces. Kunstler says that the white one is "not native" in Perak.

## 5. NICOTIANA, Linn.

Erect, viscid-pubescent herbs, shrubs, or trees. *Leaves* entire or sinuate. *Racemes* paniculate, terminal or sub-terminal. *Calyx* tubular or ovoid, 5-fid. *Corolla* funnel-shaped; lobes 5, induplicate in bud. *Stamens* attached to lower part of corolla-tube, filaments filiform; anthers ovate, dehiscing longitudinally. *Ovary* 2-celled; style filiform; stigma shortly 2-fid. *Fruit* a capsule, 2-celled, or rarely spuriously almost 4-celled; valves separating to their middle, often again splitting. *Seeds* very many, small, scarcely compressed; embryo nearly straight. —DISTRIB. Species about 35; American, Australian, Polynesian.

NICOTIANA TABACUM, Linn. Sp. Pl. 180. A herb 2 to 3 feet high branching upwards, all parts glandular-pubescent. *Leaves* large, sessile or sub-amplexicaul, ovate-lanceolate, acute, the lower decurrent; 4 to 8 in. (the lower sometimes 12 to 15 in. long) by 2 to 3 in. across; tapering to the cuneate base. *Flowers* large, in compound corymbs with short ultimate bracteate branchlets. *Calyx* campanulate, .5 in. long, .3 in. wide, teeth 5, triangular-lanceolate, .2 in. long. *Corolla* pink or pale-rose, linear-funnel-shaped, 1.75 to 2 in. long, limb 1 in. across, lobes spreading ovate, sub-acuminate. *Capsule* ovate, .75 in. long, .5 in. in diam., slightly exceeding calyx. *Seeds* small. Gaertn. Fruct. I. 264, t. 55; Lamk Ill. t. 113; Dun. in DC. Prod. XIII. 557; Miq. Flor. Ind. Bat. II. 670; Clarke in Hook. f. Flor. Brit. Ind. IV. 245.

In all the provinces, cultivated.

A native of America, cultivated in all warm countries. The common Tobacco.



Order LXXXIII. SCROPHULARIACEÆ.

[By D. PRAIN.]

Herbs or shrubs, occasionally epiphytic, sometimes semi-parasitic. *Leaves* all or only the lower opposite, rarely all alternate or whorled, occasionally all radical, sub-rosulate; stipules 0. *Flowers* hermaphrodite, usually irregular; inflorescence centripetal or composite. *Calyx* inferior, 5-, rarely 4-lobed or -partite. *Corolla* hypogynous, more or less 2-lipped or occasionally personate; upper lip entire or 2-lobed, lower 3-lobed. *Stamens* epipetalous, usually 4, didynamous or rarely sub-equal, occasionally only 2, very rarely 5; anthers 2-celled, cells distinct or apically or entirely confluent, or 1-celled by abortion, often when stamens didynamous with anthers connivent and sometimes with their apices connate in a posterior and an anterior pair. *Disk* annular, cupular, or glandular. *Ovary* superior, 2-celled; ovules usually numerous in each cell, anatropous or amphitropous; style simple; stigma capitate or dilated, simple; occasionally 2-lobed or 2-lamellate. *Fruit* usually a capsule, rarely a berry; placentas sometimes persistent on a central axis, at others attached to margins of valves. *Seeds* small with a lateral or ventral hilum; albumen fleshy, rarely absent; embryo straight or curved.—DISTRIB. Species 2,000 or more, in all regions.

*Angelonia grandiflora*, C. Morr., an American species, has become naturalised as an escape from gardens in Selangor (*Goodenough* in Herb. Ridley 10486); it has long been similarly naturalised in Tenasserim and the Irawadi Delta, and has more recently become established in the Gangetic Delta.

Corolla with upper lip or two upper lobes outmost in bud :—

Stamens 4, fertile :—

All 4 filaments inserted within corolla-tube :—

Trees or epiphytes .. .. . 1. WIGHTIA.

Herbs :—

Throat of corolla plicate, forming a 2-lobed palate; anther-cells contiguous, divaricate .. .. . 2. MAZUS.

Throat of corolla not plicate :—

Anther-cells discrete, stipitate; corolla distinctly 2-lipped :—

Upper lobe of calyx distinctly exceeding the others; 2 or sometimes all the anthers with one cell imperfect 3. ADENOSMA.

Upper lobe of calyx hardly if at all exceeding the others; all 4 stamens with perfect anthers .. 4. LIMNOPHILA.

Anther-cells contiguous; lateral calyx-lobes much narrower than the other three; corolla sub-equally 5-lobed .. .. . 5. HERPESTIS.

Only 2 posterior filaments inserted within corolla-tube; the anterior pair inserted on corolla-throat :—

Calyx with 3 to 5 distinct ridges or wings .. .. . 6. TORENIA.

- Calyx without wings or ridges:—  
 Calyx-segments narrow .. .. 7. VANDELLIA.  
 Calyx-segments broad .. .. 8. ARTANEMA.  
 Stamens only 2 posterior fertile, inserted within corolla-tube;  
 anterior pair reduced to staminodes on corolla-throat:—  
 Calyx 4-lobed, the outer lobes very broad .. .. 9. CURANGA.  
 Calyx 5-lobed, the lobes all narrow .. .. 10. BONNAYA.  
 Corolla with upper lip or 2 upper lobes inmost in bud; rarely  
 lobes imbricate:—  
 Corolla-tube very short; lobes 4, sub-equal, imbricate; stamens  
 4, sub-equal .. .. 11. SCOPARIA.  
 Corolla-tube elongated; lobes 5, 2-labiate:—  
 Calyx tubular, 5-lobed .. .. 12. STRIGA.  
 Calyx spathaceous, split in front .. .. 13. CENTRANTHERA.

### 1. WIGHTIA, Wall.

Large epiphytic climbers, eventually becoming trees. *Leaves* mostly or all opposite, quite entire, coriaceous. *Flowers* in usually axillary, often thyrsoïd racemes; large, rosy or purple, pubescent. *Calyx* campanulate, irregularly 3–5-lobed. *Corolla-tube* incurved, upper lip erect, 2-lobed, lower spreading, 3-fid. *Stamens* 4, didynamous, ascending, exserted; anthers oblong, sagittate, cells parallel. *Style* long, tip incurved; stigma simple. *Capsule* oblong-ovoid, septicidal, many-seeded, valves long, separating from the placentiferous axis, which is 2-partite or entire. *Seeds* linear, ascending, nucleus slender, testa membranous, broadly winged all round; albumen 0; embryo straight. —DISTRIB. Species 3, all S.E. Asiatic.

The species of this genus exhibit the primarily epiphytic but subsequently arboreal habit characteristic of many species of *Ficus*. Though often loosely spoken of as parasites, and though, as a matter of fact, they frequently strangle the trees on which they become established, epiphytes of this class are not parasites in the physiological sense.

WIGHTIA BORNEENSIS, Hook. f. in Ic. Plant. XV. 35, t. 1444 (1833). A tree, 20 feet in height and upwards, commencing life as an epiphyte and flowering most freely in that condition. *Leaves* opposite, thinly coriaceous, glabrous as are the lenticellate branchlets, drying brown, margin entire, outline elliptic, apex obtusely acuminate, base cuneate, narrowed to the petiole, main-nerves 2–3-jugate; length 3 to 4 in., breadth 1.25 to 1.75 in.; petiole .75 in. long. *Flowers* opposite or whorled on the rachis of axillary or terminal racemes, pedicels slender, rigid, spreading, .5 in. long; rachis stout, glabrous, erect, 6–10-flowered, 3 to 6 in. long. *Calyx* campanulate, margin entire, .4 in. across. *Corolla* trumpet-shaped, incurved, purple, densely beset with a fine stellate tomentum, 2 in. long, lobes rounded, throat slightly enlarged. *Stamens* inserted near base of corolla; filaments slender, far-exserted;

anthers sagittate. *Ovary* glabrous; style filiform; stigma simple. *Fruit* not seen.

PERAK: Larut Hill at 3,000 feet, *Derry* (Herb. Curtis, n. 3710) !—

DISTRIB. Borneo.

The solitary Perak specimen agrees well with a specimen from Borneo in Herb. Kew; as our Perak example is destitute of leaves the description of these is based on a second Bornean example of the plant. The species is most readily distinguished from the other two known species by its entire calyx-limb.

## 2. MAZUS, Lour.

Small herbs, often surculose. *Leaves* rosulate or opposite below, opposite or alternate above. *Flowers* in terminal, sub-second racemes; bracts minute or 0; bracteoles 0. *Calyx* campanulate, 5-fid; lobes large, leafy. *Corolla* 2-lipped; tube short, upper lip erect, ovate, 2-fid; lower longer, spreading, 3-fid; throat with a 2-lobed palate. *Stamens* 4, didynamous; anther-cells contiguous, divaricate. *Ovary* 2-celled; style short; stigma 2-lamellate; ovules numerous. *Capsule* globose or compressed, loculicidal, 2-valved, included. *Seeds* many, ovoid, very minute.—DISTRIB. Species about 5, Asiatic and Australian.

MAZUS RUGOSUS, Lour. Flor. Cochinchin. 385. A small annual glabrous or sparingly hirsute herb. *Leaves* many, radical, obovate-spathulate, irregularly coarsely crenate, narrowed to a short petiole, .75 to 3 in. long. *Scapes* numerous from the root, 2 to 10 in. long, leafless or with a few alternate spathulate leaves, with terminal racemes 1 to 6 in. long, the pedicels slender, .25 to .5 in. long, usually without bracteoles. *Calyx* campanulate, .25 in. long, lobes ovate-lanceolate, acute, half as long as tube, spreading in fruit. *Corolla* pale blue, .3 in. long. *Capsule* .2 in. long, included in the calyx; calyx-mouth in front .3 to .5 in. across. *Seeds* very minute; testa pale straw-coloured. Benth. in DC. Prod. X. 375; Boiss. Fl. Orient. IV. 424; Miq. Flor. Ind. Bat. II. 677; Hook. f. Flor. Brit. Ind. IV. 259. *M. bicolor*, Benth. in Wall. Cat. 3913. *M. vandelliioides*, Hance in Walp. Ann. III. 193. *Lindernia japonica*, Thunb. Flor. Japon. 253. *Hornemannia bicolor*, Willd. Enum. Hort. Berol. 654; Reichb. Icon. Exot. 25, t. 37. *Columnea tomentosa*, Roxb. Flor. Ind. III. 98. *Stemodia tomentosa*, G. Don Gen. Syst. Gard. IV. 842. *Tittmannia obovata*, Bunge Enum. Pl. Chin. 279. *Vandellia obovata*, Walp. Act. Acad. Leopold. XIX., Suppl. I. 394. *Gratiola goodeniasfolia*, Hornem. Hort. Hafn.

SINGAPORE: a garden weed, *Ridley* !—DISTRIB. E. and S.E. Asia generally.

## 3. ADENOSMA, R. Br.

Annual, villous or glandular aromatic herbs. *Leaves* opposite, rugose, crenulate. *Flowers* axillary or in leafy spikes, racemes or

heads; bracteoles conspicuous or absent. *Calyx* deeply 5-lobed; lobes imbricate, the upper the largest; sometimes in fruit all enlarged. *Corolla* 2-lipped; upper lip erect, entire or notched, outmost in bud; lower 3-lobed, spreading; throat not plicate; tube cylindric. *Stamens* 4, didynamous, included; anther-cells discrete, stipitate, one cell of each anterior stamen or of all four stamens empty. *Ovary* 2-celled; ovules in each cell numerous; style filiform below, winged upwards under the entire or 2-lamellate stigma. *Fruit* an ovoid, ellipsoid, or lanceolate 2-grooved and 4-valved capsule, opening both loculicidally and septicidally. *Seeds* many, minute, reticulate.—DISTRIB. Species about 10, in S.E. Asia and Australia.

Flowers axillary; outer fruiting sepals enlarged :—

Leaves ovate-obtuse, crenate-serrate .. ..	1. <i>A. ovatum</i> .
Leaves ovate-acute, serrate .. ..	2. <i>A. inopinatum</i> .

Flowers in terminal heads, spikes or racemes; sepals little altered :—

Bracts linear, hardly exceeding the calyx :—	
Spikes short, dense, cylindric or capitate .. ..	3. <i>A. capitatum</i> .
Spikes long, slender .. ..	4. <i>A. cœruleum</i> .
Bracts leafy, elliptic, acute, longer than calyx .. ..	5. <i>A. hirsutum</i> .

1. *ADENOSMA OVATUM*, Benth. in Hook. fil. Flor. Brit. Ind. IV. 263. A puberulous or glabrate herb, branched from the base; branches rooting below, prostrate or ascending, 6 to 18 in. long. *Leaves* ovate-obtuse, crenate-serrate, base wide-cuneate, rounded or truncate; blade .75 in. long, .5 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than the calyx. *Calyx* of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, pubescent, the 3 outer enlarged, .35 in. wide, ovate-cordate, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones. *Herpestis ovata*, Benth. Scroph. Ind. 30; Wall. Cat. 3896. *H. javanica*, Bl. Bijdr. 748. *Pterostigma ovatum*, Benth. in DC. Prod. X. 380; Miq. Flor. Ind. Bat. II. 678.

PERAK: Gunong Tundul, *Ridley* 9444! PENANG: Waterfall, *Curtis*! MALACCA: *Griffith*! SINGAPORE: Bukit Timah, *Ridley* 6894! "a garden weed," *Ridley* 8910!—DISTRIB. Indo-China, Malay Archipelago.

2. *ADENOSMA INOPINATUM*, Prain Journ. As. Soc. Beng. LXXII. 2, 16. A pubescent herb, branched from the base; branches rooting below, ascending, 6 to 18 in. long. *Leaves* ovate-acute, serrate, base cuneate; blade 1 to 1.5 in. long, .75 to 1 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than calyx. *Calyx*



of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, the 3 outer enlarged, .25 in. wide, ovate-lanceolate with truncate bases, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones.

MALACCA: *Griffith*! SINGAPORE: *Anderson*! *King's Collector*!

Very nearly allied to *A. ovatum*, Benth., and *A. subrepens*, Benth. It differs from both by its acute leaves, but except in this respect and as regards its distribution it is hardly separable from *A. subrepens* of Ceylon. From *A. ovatum* of Tenasserim, with which it has been confused, it further differs in its larger size, coarser habit of growth, and much narrower outer sepals. It has also been confused with *A. cœruleum*, from which it differs by its flowers being all axillary and by its enlarged fruiting sepals.

3. *ADENOSMA CAPITATUM*, Benth. in Hook. f. Flor. Brit. Ind. IV. 264. A stout, erect, glandular-villous herb, 1 to 2 feet high. *Leaves* ovate or oblong, sub-acute, serrate, often reflexed; base cuneate; blade 1 to 2 in. long, .5 to .75 in. wide; petiole very short. *Flowers* in dense cylindrical or globose terminal or axillary heads, with basal involucre of floral leaves; peduncles 1 in. or less, sometimes in the lower clusters sub-obsolete and the flowers in axillary whorls; heads usually .5 in. across, sometimes longer up to 4 in. long; bracts linear, hardly exceeding the sepals. *Calyx* of 5 almost free sepals, villous with long hairs, .25 in. long, the uppermost ovate-lanceolate, broader than the other lanceolate. *Corolla* blue. *Capsule* ovoid, .2 in. long. *Stemodia capitata*, Benth. in Bot. Reg. under t. 1470; Wall. Cat. 3926. *Pterostigma spicatum*, Benth. Scroph. Ind. 21. *P. capitatum*, Benth. Scroph. Ind. 31, and in DC. Prod. X. 380. *Erinus bilabiatus*, Roxb. Fl. Ind. III. 92.

PROV. WELLESLEY: *King*! *King's Collector*. PENANG: *Wallich*; *Deschamps*! *Curtis*! SINGAPORE: *King*! *Ridley*! MALACCA: *Cuming*! Ayer Keroh, *Ridley*! *Griffith*; *Wallich*. NEGRI SEMBILAN: Kwala Pedas, *Ridley*! PAHANG: *Ridley*!—DISTRIB. Throughout S.E. Asia.

4. *ADENOSMA CÆRULEUM*, R. Br. Prod. 443. An erect herb, 1 to 2 feet high, viscidly pubescent. *Leaves* ovate-acute, crenate, base rounded or cordate; blade 1.5 to 2.5 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* in long slender strict spikes; bracts lanceolate, about as long as calyx. *Calyx* of 5 almost free sepals, the upper lanceolate the rest linear, not very greatly altered in fruit. *Corolla* blue. *Capsule* lanceolate, rather longer than the sepals. Benth. Flor. Austral. IV. 484; Hook. f. Flor. Brit. Ind. IV. 263. *Pterostigma villosum*, Benth. Scroph. Ind. 21, and in DC. Prod. X. 380 partly; Miq. Flor. Ind. Bat. II. 678. *P. strictum*, Griff. Not. IV. 96; Ic. Pl. Asiat. t. 417, f. 3. *Stemodia cœrulea*, Benth. in DC. Prod. X. 381. *Herpestis lanuginosa*, Bl. Bijdr. 747.

SELANGOR: *Ridley*! PERAK: *Scortechini*! Wray! MALACCA: *Griffith*! *Cuming*! *Maingay*; *Hervey*! SINGAPORE: *Cuming*! *Wallich*.  
—DISTRIB. Indo-China, Malaya, Australia.

*Scortechini* notes on this, "aromatic; most likely introduced." It appears, however, to be native.

5. *ADENOSMA HIRSUTUM*, Kurz Journ. As. Soc. Beng. XLV. 2. 143. A stout, erect, villous herb, 2 to 3 feet high. *Leaves* ovate or elliptic, sub-acute, serrate, base cuneate; blade 1 to 2 in. long, .5 to .75 in. wide; petiole very short or 0. *Flowers* in dense cylindric or oblong heads, often ternate, usually peduncled, with closely imbricate hirsute leafy bracts; peduncles sometimes 1.5 in. long; heads 1 to 3 in. long, .75 to 1 in. wide; bracts ovate-acute, serrate, .4 to .6 in. long. *Calyx* of 5 almost free villous linear sepals, .25 in. long. *Corolla* blue. *Cap-sule* ovate, abruptly beaked, as long as calyx. *Pterostigma hirsutum*, Miq. Flor. Ind. Bat. Suppl. 562. *P. villosum*, Miq. l.c. (not of Benth.).

PROVINCE WELLESLEY: *Curtis* 2238! *Ridley* 6977! NICOBARS: *Kamorta*, Kurz!—DISTRIB. Sumatra (*Teysmann* 1157), Bangka (*Teysmann* 3429), Borneo (*Motley*, n. 215).

A coarser plant than *A. capitatum*, with leafy bracts throughout the spikes.

#### 4. *LIMNOPHILA*, R. Br.

Herbs of marshes and pools, glabrous or pubescent, aromatic. *Leaves* with transparent dots, opposite or whorled, toothed or cut, when submerged frequently laciniate-multifid. *Flowers* solitary axillary, sessile or pedicelled, or passing into terminal spikes or racemes; bracts leafy; bracteoles small or obsolete. *Calyx* 5-partite; lobes narrow, imbricate, all equal or the upper largest. *Corolla* 2-labiate; upper lip outmost, sub-erect, entire or 2-fid; lower spreading, 3-lobed; throat not plicate; tube cylindric. *Stamens* 4, didynamous, included; anther-cells all perfect, usually discrete, stipitate, occasionally contiguous. *Ovary* 2-celled; ovules in each cell numerous; style slender, with deflexed tip and 2-lamellate stigma. *Fruit* an ovoid or oblong capsule, with both septical and loculicidal dehiscence, the placentiferous septum separating from the valves. *Seeds* many, minute, angular and truncate, reticulate.—DISTRIB. Species about 25, in the tropics of the Eastern Hemisphere and Australia.

*Leaves* never pinnatifid above, very rarely so even on lower portion of stem:—

*Flowers* sessile:—

*Leaves* at least 1 in. long:—

*Leaves* petioled, 2 to 3 in. long, pubescent or glabrous .. 1. *L. Roxburghii*.

- Flowers all pedicelled, the pedicels exceeding the calyx ; all the  
leaves capillary multifid .. .. 11. *L. Griffithii*.

Vit. 184 (not of Nees). *Eclipta scabriuscula*, Wall. Cat. 3212.

China.

strongly of Aniseed.

2. *LIMNOPHILA BALSAMEA*, Benth. in DC. Prod. X. 386. A stoutish, softly pubescent herb; stem 1 to 2 feet high. *Leaves* opposite, elliptic, sub-acute, narrowed from the middle to the base with margin entire, beyond the middle obscurely crenulate, punctate beneath, nerves slender, 3 to 5 pairs; length up to 2 in., width to 1 in.; petiole 0. *Flowers* in short peduncled axillary heads or spikes. *Calyx* hirsute, .15 in. long; lobes lanceolate, finely acuminate; in fruit striate. *Corolla* .35 in. long. *Capsule* .2 in. long, broadly elliptic, obtuse. Hook. f. Flor. Brit. Ind. IV. 266. *Stemodia balsamea*, Benth. Scroph. Ind. 23; Wall. Cat. 3928.

PERAK: *King's Collector* 1027!—DISTRIB. Indo-China.

3. *LIMNOPHILA MICRANTHA*, Benth. in DC. Prod. X. 387. A small, stoutish, glabrous herb, creeping below; stem 3 to 6 in. long, branching from the base. *Leaves* all opposite, crowded, thick, .25 to .45 in. long, margin entire or very sparingly sub-serrate, punctate beneath; nerves obscure; petiole 0. *Flowers* axillary, sub-sessile, small. *Calyx* .06 in. long, glabrous; lobes subulate, in fruit striate. *Corolla* reddish-purple, .12 in. long. *Capsule* ovate, .08 in. long. Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia micrantha*, Benth. Scroph. Ind. 23; Wall. Cat. 3936. *Herpestris pygmæa*, Griff. Notul. IV. 104.

PAHANG: *Ridley*!—DISTRIB. Indo-China, Bengal.

4. *LIMNOPHILA VILLOSA*, Bl. Bijdr. 750. An erect or spreading, sub-simple, stoutish or slender, pubescent herb; stems 4 to 6 in. high. *Leaves* opposite, elliptic-oblong, sub-crenate, .5 to .75 in. long, punctate beneath, nerves obscure; petiole 0. *Flowers* axillary, solitary, on short pubescent pedicels, .15 in. long, erect in fruit. *Calyx* hirsute, .15 in. long, lobes lanceolate, acuminate-subulate, in fruit striate. *Corolla* .2 in. long. *Capsule* .15 in. long, ovate. Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 681. *L. laxa*, Benth. in DC. Prod. X. 388 partly. *L. pulcherrima*, Hook. f. Flor. Brit. Ind. IV. 267. *Herpestris pulcherrima*, Griff. Notul. IV. 104.

PERAK: *Wray* 788! MALACCA: *Griffith*! *Cuming*! *Maingay*! *Ridley*! *Hervey*! PENANG: *Tulloh Bahang*, *Curtis*! *Ridley* 7104! PAHANG: *Ridley*! SINGAPORE: *King's Collector*! *Hullett*! *Deschamps*! *Kurz*! *Ridley*! PROVINCE WELLESLEY: *King*! SALAMA: *Scortechini*!—DISTRIB. Sumatra, Java.

5. *LIMNOPHILA HIRSUTA*, Benth. in DC. Prod. X. 388. An erect hirsute herb; stem 6 to 8 in. high. *Leaves* opposite or 3-4-nately whorled, elliptic, linear-oblong or sub-spathulate, 1.5 to 2.5 in. long, apex obtuse, margin serrulate, punctate beneath, nerves few, very indistinct; petiole short or obsolete. *Flowers* axillary, solitary or cymose or paniculate at the apex of the stem; pedicels .2 to .75 in.



bracteoles minute. *Calyx* .3 in. long, hirsute; lobes lanceolate, finely acuminate, in fruit striate. *Corolla* .5 in. long. *Capsule* sub-orbicular, .25 in. long. Hook. f. Flor. Brit. Ind. IV. 263. *L. javanica*, A. DC. in DC. Prod. X. 594. *Stemodia hirsuta*, Heyne, ex Wall. in Cat. 3930; Benth. Scroph. Ind. 24. *Ambulia ebracteata*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 263.

NICOBARS: *Kurz*! PERAK: *Scortechini*! *Kunstler*! MALACCA: *Ridley*!—DISTRIB. India, Indo-China, Malay Archipelago, China.

6. *LIMNOPHILA PYGMAEA*, Hook. f. Flor. Brit. Ind. IV. 263. A very small, glabrous, much-branched creeping herb; branches 4 to 6 in. long, divaricate. *Leaves* opposite, .3 to .4 in. long, oblong-lanceolate, apex acute, margin sub-serrate; punctate beneath, nerves very obscure; petiole 0. *Flowers* axillary, solitary, pedicels slender, .15 to .2 in. long, erect in fruit. *Calyx* .15 in. long, hirsute, lobes subulate-lanceolate, striate in fruit. *Corolla* .2 in. long. *Capsule* .15 in., ovate. *Herpestis pygmæa*, Griff. Notul. IV. 104. *Stemodia diffusa*, Benth. in Wall. Cat. 3937.

MALACCA: *Griffith*! *Cuming*!—DISTRIB. Tenasserim.

7. *LIMNOPHILA ERECTA*, Benth. in DC. Prod. X. 388. An erect, sub-simple or branched, stoutish glabrous herb; stems 4 to 8 in. high. *Leaves* all opposite, linear-oblong, .5 to 1 in. long, apex acute, margin sub-serrate except the narrow cuneate base, punctate beneath, nerves obscure; petiole very short or obsolete. *Flowers* white, axillary, solitary, on short pedicels, .1 in. long, recurved in fruit. *Calyx* glabrous, .15 in. long, lobes lanceolate, acuminate, in fruit striate. *Corolla* .2 in. long. *Capsule* .15 in. long, ovate. Maxim. Mel. Biol. IX. 406; Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia gratioides*, Benth. Scroph. Ind. 25; Wall. Cat. 3938.

PERAK: *Scortechini*! *Wray*! *King's Collector*! NEGRI SEMBILAN: *Ridley*! SELANGOR: *Ridley*! PAHANG: *Ridley*!—DISTRIB. Indo-China, Bengal, S. China.

8. *LIMNOPHILA GRATISSIMA*, Bl. Bijdr. 749. An erect, glabrous herb with a stout stem, 1 to 2 feet high, simple or occasionally branched above. *Leaves* opposite and ternate, half-amplexicaul, linear-oblong, 1.5 to 2.5 in. long, apex sub-acute, margin serrulate, punctate beneath, nerves few, indistinct; petiole 0. *Flowers* in axillary and terminal many-flowered racemes, rarely flowers axillary solitary, sometimes the racemes 12 in. long and paniculately branched with the flowers whorled, at others the racemes reduced; pedicels .5 to 1 in. long, glandular; bracteoles minute. *Calyx* .3 in. long, glabrate, lobes lanceolate-acuminate; in fruit calyx hemispherical with lobes striate. *Corolla* .5 in. long. *Capsule* oblong, acute, .3 in. long. Benth. Scroph. Ind. 26;

Wall. Cat. 3906; Hook. f. Flor. Brit. Ind. IV. 268. *L. punctata*, Bl. Bijdr. 750; Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 682; Maxim. Mel. Biol. IX. 406. *Gratiola aromatica*, Pers. Synops. I. 14. *Ambulia aromatica*, Lamk Encycl. Meth. I. 128. Rheede Hort. Malab. X. 6.

MALACCA: *Griffith*. PERAK: *King's Collector*! *Wray*!—DISTRIB. S.E. Asia generally, N. Australia.

9. *LIMNOPHILA SESSIFLORA*, Blume Bijdr. 750. A hirsute or rarely glabrate herb; stem stoutish, 4 to 8 in. long. *Leaves* 3 to 6 in a whorl throughout all lobulate or pinnatisect, or the uppermost very rarely opposite entire, usually about .4 to .5 in. long. *Flowers* axillary solitary, sessile or shortly pedicelled. *Calyx* .3 in. long, lobes ovate-acuminate, tube in fruit membranous, hemispheric, not striate. *Corolla* .5 in. long. *Capsule* orbicular, turgid, .2 in. across. Benth. Scroph. Ind. 25; Wall. Cat. 3902; DC. Prod. X. 389; Miq. Flor. Ind. Bat. II. 683; Hook. f. Flor. Brit. Ind. IV. 270. *Hottonia sessiliflora*, Vahl Symb. II. 36.

KEDAH: Langkawi, in swamps, *Curtis*!—DISTRIB. Throughout S.E. Asia.

10. *LIMNOPHILA HETEROPHYLLA*, Benth.; var. *reflexa*, Hook. f. Flor. Brit. Ind. IV. 270. A glabrous herb with a very slender elongated stem, 1 to 1.5 feet long. *Leaves* towards apex of stem usually opposite, small, rarely over .25 in. long, sessile, half-amplexicaul, oblong, margin crenulate; followed by pinnatifid leaves 4 to 6 in a whorl, .5 in. long; with below these submerged whorled and very finely capillary-multifid leaves, .5 in. long. *Flowers* axillary solitary, the upper sub-sessile passing into a short leafy spike, the lower pedicelled, with pedicels recurved in fruit and longer than the calyx. *Calyx* .25 in. long, lobes ovate, very shortly acuminate, in fruit not at all striate; tube in fruit hemispheric, membranous. *Corolla* .4 in. long. *Capsule* sub-globose, .3 in. long. *L. reflexa*, Benth. Scroph. Ind. 25; DC. Prod. X. 389; Wall. Cat. 3904.

MALACCA: *Cuming*. KEDAH: *Curtis* 2103!—DISTRIB. (of variety,) Tenasserim: (of type,) throughout S.E. Asia.

This variety differs from the type in having distinctly shorter *submerged* leaves, and distinctly longer pedicels to the lower flowers.

11. *LIMNOPHILA GRIFFITHII*, Hook. f. Flor. Brit. Ind. IV. 271. A very small herb with creeping tufted stems, sending down long rigid roots and emitting many erect branches, 1 to 2 in. long, sometimes stout and stiff, sometimes slender and flaccid. *Leaves* .25 to .35 in. long, usually densely whorled and imbricated, multifid. *Flowers* axillary solitary, on slender pedicels, .35 to .5 in. long, that are deflexed

in fruit. *Calyx* .1 in. long, teeth short. *Corolla* pure white, .4 in. long. *L. sessiliflora*, Griff. Notul. IV. 99, t. 418, f. 5 (not of Bl.). *L. gratio- loides* var. *myriophylloides*, Benth. in DC. Prod. X. 389 partly. *Quin- quelobus glaber*, Benj. in Linnæa XX. 316. *Benjaminea glabra*, Benj. in Linnæa XX. 761.

MALACCA: Griffith! Leman, Cuming! Maingay! PERAK: King's Collector!

Griffith's specimens have slightly larger leaf-segments and shorter pedicels than those of Maingay, Cuming, and Kunstler, where the leaf-segments are finely capillary. But Griffith's plant evidently grew on mud, while that of Kunstler was floating in water, and the difference of habitat probably sufficiently explains the difference in foliage. The flowers of the two forms are the same.

### 5. HERPESTIS, Gaertn. f.

Herbs, glabrous. *Leaves* often dotted, entire or toothed, or below submerged and multifid. *Flowers* axillary or racemose; bracteoles small or obsolete. *Calyx* 5-partite; lobes imbricate, the upper largest, the two lateral inmost often very narrow. *Corolla* indistinctly 2-lipped; upper lip outmost spreading, 2-lobed or only emarginate, lower 3-lobed; tube cylindric. *Stamens* 4, didynamous, included; anthers sometimes approximate in pairs; cells contiguous, parallel, not confluent. *Ovary* 2-celled; ovules in each cell numerous; style dilated at the top; stigma entire or 2-lobed. *Fruit* a globose or ovoid 2-celled capsule; valves 2 or 4, separating from the placentiferous septum. *Seeds* many, very minute.—DISTRIB. Species about 50, throughout the tropics.

HERPESTIS MONNIERIA, H. B. & K. Nov. Gen. and Sp. II. 366. A glabrous, rather succulent creeping herb, rooting at the nodes; branches 4 to 10 in. long. *Leaves* obovate-oblong, spatulate, sessile, obtuse, entire, .5 to .75 in. long. *Flowers* axillary, peduncles usually .75 to 1 in. long; bracteoles 2. *Calyx* of 5 nearly free sepals, .2 to .3 in. long, the upper sepal ovate. *Corolla* white, faintly tinged with blue, .4 to .6 in. long, lobes sub-equal. *Capsule* ovoid, acute, hidden by the sepals, .15 to .25 in. long. *Seeds* minute, irregular; testa pale. Benth. Scroph. Ind. 30, and in DC. Prod. X. 410; Wall. Cat. 3900; Dalz. & Gibs. Bomb. Flor. 178; Miq. Flor. Ind. Bat. II. 685; Bot. Mag. t. 2557; Boiss. Flor. Orient. IV. 426; Hook. f. Flor. Brit. Ind. IV. 272. *H. spatulata*, Bl. Bijdr. 748. *Gratiola Monnieria*, Linn. Cent. Pl. II. n. 120; Roxb. Cor. Pl. II. 41, t. 178, and Flor. Ind. I. 141. *Septis repens*, Lour. Flor. Cochinchin. 392. *Bramia indica*, Lamk Encyc. I. 459. Rheed. Hort. Malab. X. t. 14.

MALACCA: Hervey! JOHORE: Hullett! SINGAPORE: Kurz! Ridley!—DISTRIB. Throughout the tropics.

## 6. TORENIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, entire or crenate or serrate. *Flowers* often showy, axillary, or in terminal or pseudo-axillary racemes or umbels; bracteoles 0. *Calyx* 2-lipped or 3-5-toothed, 3-5-keeled or -winged or -folded. *Corolla* 2-lipped; upper lip outmost erect, concave or pinched, notched or 2-fid; lower larger spreading, 3-lobed; tube cylindric, somewhat curved, dilated upwards. *Stamens* 4, didynamous; upper pair included inserted on corolla-tube; lower inserted on throat, appendaged or not at base, and connivent under upper lip; anthers contiguous or connate in pairs, cells often confluent. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a linear or oblong, included septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, rugose or cancellate.—DISTRIB. Species 20, Tropical Asiatic and African, one American.

*Calyx* very distinctly winged:—

Fruiting calyx sub-orbicular, as broad as long; stems prostrate and rooting .. .. 1. *T. polygonoides*.

Fruiting calyx longer than broad; stems erect:—

Wings broad distinctly decurrent on the pedicels; corolla very little exserted; bracteoles very small; pedicels shorter than the calyx .. .. 2. *T. peduncularis*.

Wings narrow hardly decurrent on the pedicels; corolla distinctly exserted; bracteoles large; pedicels as long as or longer than the calyx .. .. 3. *T. ciliata*.

*Calyx* hardly or not at all winged:—

Flowers all axillary:—

Stems and leaves glabrous; calyx deeply lobed, faintly winged .. .. 4. *T. asiatica*.

Stems and leaves hirsute; calyx wingless, shortly lobed .. 5. *T. Benthamiana*.

Flowers in terminal racemes; stems and leaves hirsute; calyx wingless, shortly lobed .. .. 6. *T. flava*.

1. *TORENIA POLYGONOIDES*, Benth. Scroph. Ind. 39. A slender straggling herb; branches 6 to 12 in. long, decumbent and often rooting at the nodes; all parts glabrous. *Leaves* orbicular-ovate, serrate; lamina 4 to 5 in. long, 35 to 45 in. wide, apex acute or sub-acute, base cuneate; petiole slender, 25 in. long. *Flowers* axillary on 2-4-flowered peduncles; pedicels 25 in. long, slender; bracteoles minute. *Calyx* tubular with very wide wings, in fruit sub-orbicular 3 in. in diam. *Corolla* 35 in. long, white or white and pink, distinctly exserted. DC. Prod. X. 409; Miq. Flor. Ind. Bat. II. 688; Hook. f. Flor. Brit. Ind. IV. 276. *T. cardiosepala*, Benth. in DC. Prod. X. 409. *Herpestis polygonoides*, Benth. in Wall. Cat. 3897.



SINGAPORE: Wallich 3897! King's Collector! Hullett! Murton, Kuntze! Schomburgk! Anderson! Kurz! MALACCA: Maingay! Griffith! Goodenough! PENANG: Bouton; Deschamps! PERAK: Gapis Pass, Curtis 2688!

2. *TORENIA PEDUNCULARIS*, Benth. in Wall. Cat. 3956. An erect annual herb 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with recurved hairs. *Leaves* ovate-lanceolate, base cordate, apex acuminate, margin serrate; lamina membranous 1 to 2 in. long, .5 to 1 in. wide, sparingly hairy on both surfaces; petiole slender, sparsely hirsute, .5 to .75 in. long. *Flowers* axillary solitary, or the uppermost in a sub-umbellate corymb or a terminal raceme, the lowest in the raceme leaf-opposed; pedicels .3 in., in fruit .5 in. long, thickened upwards, shorter than the calyx; bracteoles linear-subulate small. *Calyx-tube* narrow-ovate, .6 in., in fruit .85 in. long, wings broad, decurrent on the pedicel, the margins ciliate. *Corolla* .75 in. long, little exserted, tube yellow below, pale blue above, lateral lobes of lip with darker blotches. *Stamens* with glabrous filaments not appendaged. *Disk* cupular. Hook. f. Flor. Brit. Ind. IV. 276. *T. edentula*, Benth. in DC. Prod. X. 410; Bot. Mag. t. 4229.

PENANG: Schomburgk! MALACCA: Goodenough! PERAK: Scortechini! Ridley 9457! 9758! Ipoh, Curtis! NICOBARS: Kamorta, Kurz!—DISTRIB. Indo-China, Java, Timor.

3. *TORENIA CILIATA*, Sm. in Rees Cyclop. V. 36. An erect annual herb, 1 to 2 feet high, branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles. *Leaves* ovate, base wide cuneate, apex obtuse or sub-acute, margin entire or crenate; lamina membranous 1.5 to 2.5 in. long, .75 to 1.25 in. wide, sparingly hairy on both surfaces; petiole winged above .25 to .5 in. long, sometimes shorter. *Flowers* in distant pairs, racemed at the ends of the branches; pedicels .3 in., in fruit .4 in. long, thickened upwards, as long as or longer than the calyx; bracteoles .3 in. long, linear, hirsute, as long as the flowering pedicels. *Calyx* very narrow-tubular, .4 in., in fruit .6 in. long, wings distinct but narrow, the margins ciliate. *Corolla* .75 in. long, distinctly exserted, light blue. Benth. in DC. Prod. X. 411; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 279. *T. racemosa*, Benth. Scroph. Ind. 38 (not of Griff.). *T. caerulea*, Miq. Flor. Ind. Bat. Suppl. 562. *T. flava*, Wall. Cat. 3957 (in part); Miq. Flor. Ind. Bat. Suppl. 562 (not of Ham).

PENANG: Wallich! Deschamps! PERAK: King's Collector! Scortechini! Ridley!—DISTRIB. Sumatra, Timor.

Very near to *T. peduncularis*, and really only separable by its smaller more winged calyx. It may be remarked that Kurz in Herb. Calcutta has suggested that *T. ciliata*

is = *T. peduncularis*, while in the field Scortechini has named *T. peduncularis*, "*T. ciliata*."

4. *TORENIA ASIATICA*, Linn. Sp. Pl. 619. A sub-erect or spreading slightly branching herb, stems quadrangular glabrous. *Leaves* ovate-lanceolate, base cuneate, margin finely serrate; lamina 1.5 to 2.5 in. long, 1 to 1.5 in. wide, membranous, glabrous; petiole slender, glabrous, .5 in. long. *Flowers* axillary, pedicels .5 in. long; bracteoles minute subulate. *Calyx* .5 in. long, deeply 5-partite, lobes narrow-lanceolate, with a prominent midrib. *Corolla* 1.5 in. long, tube narrow-cylindric at base, infundibuliform above, dark violet on both sides, upper lobe erect, lip 3-lobed spreading, all yellowish. *Stamens* with appendages on anterior filaments. *Disk* cupular waved. Wight Ic. t. 862; Benth. in DC. Prod. X. 410; Wall. Cat. 3953 A. B.; Miq. Flor. Ind. Bat. II. 689; Gaertn. Fruct. III. 29, t. 184; Lamk Ill. t. 523; Bot. Mag. t. 4249; Lem. Ill. Hortie. t. 199; Flore des Serres II. t. 157; XIII. t. 1342; Hook. f. Flor. Brit. Ind. IV. 277. *Treisteria cordata*, Griff. Notul. IV. 109. Rheede Hort. Malab. IX. t. 53.

PERAK: Scortechini 2212! Ridley 5307! 9756! King's Collector 1816! Curtis! SELANGOR: Ridley 8533!—DISTRIB. India, Sumatra, Java, Indo-China, China.

5. *TORENIA BENTHAMIANA*, Hance Ann. Sc. Nat. Ser. 4. XVIII. 226. A slender straggling herb; branches 6 to 10 in. long, decumbent and often rooting at the nodes, all parts sparingly hirsute. *Leaves* ovate, acute, margin serrate; lamina .5 to .75 in. long, .3 to .4 in. wide, base truncate or cuneate; petiole .25 in. long. *Flowers* axillary, solitary, pedicels .75 to 1.25 in. long, slender; bracteoles minute. *Calyx* very narrow-tubular, .35 in. long, in fruit .5 in. long, keeled and channelled but not winged, hirsute with sparse spreading hairs. *Corolla* 1.25 in. long, distinctly exserted; tube violet purple, limb yellow. *T. Bailloni* Godef. in Ill. Hortie. XXV. t. 324; E. Morr. in Belg. Hortie. XXIX. t. 9, f. 2. *T. flava*, Bot. Mag. t. 6700 (not of Ham.).

JOHORE: Ridley 4160!—DISTRIB. Siam, Cochin-China, S. China.

6. *TORENIA FLAVA*, Ham. in Wall. Cat. 3957. An erect annual herb, 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with spreading hairs. *Leaves* ovate or ovate-oblong, base wide-cuneate, margin entire or crenate; lamina membranous 1 to 1.5 in. long, .7 to 1 in. wide, hairy on both surfaces; petiole winged above, often very short. *Flowers* racemed at the ends of the branches; pedicels .2 in., in fruit .3 in. long, thickened upwards, shorter than the calyx; bracteoles .4 in. long linear, hirsute, rather longer than the fruiting pedicels. *Calyx* very narrow-tubular .35 in., in fruit .5 in. long, keeled and channelled but not winged, hirsute

throughout with sparse spreading hairs. *Corolla* .75 in. long, distinctly exserted, bright yellow. Benth. Scroph. Ind. 38, and in DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 278. *Pentstemon racemosus*, Griff. Notul. IV. 120. *Mimulus hirsutus*, Bl. Bijdr. 756.

PERAK: *Kunstler* 904!—DISTRIB. Indo-China, Malaya.

# 7. VANDELLIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, often toothed, usually penninerved. *Flowers* small, axillary or racemose; bracteoles 0. *Calyx* campanulate, 5-toothed, or oftener deeply 5-partite, neither keeled nor winged. *Corolla* 2-lipped; upper lip outmost, erect, concave, emarginate or 2-fid; lower wider, spreading, 3-lobed; tube cylindric. *Stamens* 4, didynamous; the posterior pair inserted in corolla-tube, usually included, the anterior pair inserted on corolla-throat, with arched filaments appendaged near the base; anthers contiguous or connate in pairs under upper lip, cells divaricate. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose or ovoid, or long cylindric, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species about 30, mostly S.E. Asiatic.

Capsule about equalling or shorter than the calyx :—

Calyx very shortly 5-lobed .. .. . 1. *V. crustacea*.

Calyx divided almost to the base in 5 sepals :—

Sepals longer than the capsule :—

Stems erect; all parts sparsely beset with spreading hairs;

leaves entire or sinuate. . . . . 2. *V. hirsuta*.

Stems procumbent; all parts softly villous; leaves crenate-

serrate .. .. . 3. *V. mollis*.

Sepals not longer than the capsule :—

Leaves sessile .. .. . 4. *V. scabra*.

Leaves petioled .. .. . 5. *V. elata*.

Capsule much longer than the calyx .. .. . 6. *V. pedunculata*.

1. VANDELLIA CRUSTACEA, Benth. Scroph. Ind. 35. A diffusely trichotomously branched, glabrous or sparsely hairy herb; branches mostly from near the root; stems 4 to 18 in. high. *Leaves* ovate or lanceolate, entire or serrate; lamina .5 to 1 in. long, .25 to .5 in. wide; petioles short. *Flowers* axillary or sub-racemose; pedicels slender, strict, .5 to 1.5 in. long. *Calyx* shortly 5-lobed, in flower .1 in., in fruit .15 in. long. *Corolla* pale purple or white. *Capsule* ovate-oblong, obtuse, .12 in. long. DC. Prod. X. 413; Wight Ic. t. 863; Miq. Flor. Ind. Bat. II. 690; Hook. f. Flor. Brit. Ind. IV. 279. *V. alba*, Benth.

Scroph. Ind. 35. *Torenia varians*, Roxb. Fl. Ind. III. 96. *T. lucida*, Ham. in Wall. Cat. 3962. *T. alba*, Ham. in Wall. Cat. 3961 partly. *T. flaccida*, R. Br. Prod. 440. *Gratiola lucida*, Vahl Enum. I. 95; Roxb. Cor. Pl. II. 2, t. 202, and Flor. Ind. I. 138. *G. aspera*, Roth Nov. Pl. II. *Peristaira paniculata*, Griff. Notul. IV. 119. *Capraria crustacea*, Linn. Mant. 87. *Morgania lucida*, Spreng. Syst. II. 802. *M. aspera*, Spreng. Syst. II. 803. *Mimulus javanicus*, Bl. Bijdr. 283. *Hornemannia ovata*, Link & Otto Ic. Pl. Sel. I. 9, t. 3. *Tittmannia ovata*, Reichb. Icon. Exot. I. 27. *Antirrhinum hexandrum*, Forsk. Flor. Ægypt.-Arab. 43. Rumph. Herb. Amb. V. t. 170, f. 3.

PENANG: *Curtis*! PROV. WELLESLEY: *King*! PERAK: *Curtis*! SINGAPORE: *Wallich*! *Schomburgk*! *Ridley*! *Hullett*! *Kunstler*! *Deschamps*! *Kurz*! PAHANG: *Ridley*! MALACCA: *Hervey*!—DISTRIB. Cosmopolitan in the tropics.

2. *VANDELLIA HIRSUTA*, Benth. Scroph. Ind. 36. An erect succulent trichotomously branched herb, 4 to 6 in. high, sparsely clothed with spreading hairs. *Leaves* ovate or oblong, obtuse, entire or sinuate, 1 to 3 in. long; upper sessile .5 to 1 in. wide, lower petioled, .4 to .75 in. wide. *Flowers* minute in many-flowered racemes; pedicels slender, .15 to .2 in. long. *Sepals* lanceolate .08 in., in fruit .1 in. long. *Corolla* blueish-white. *Capsule* orbicular .08 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia ovata*, Benth. in Wall. Cat. 3942. *T. viscosa*, Reichb. Ic. Exot. I. 26, t. 38. *Hornemannia prostrata*, Jacq. Ecl. t. 150.

PERAK: *Kunstler*! PAHANG: *Ridley*! SINGAPORE: *Ridley* 2701! —DISTRIB. S.E. Asia generally.

3. *VANDELLIA MOLLIS*, Benth. Scroph. Ind. 37. A procumbent herb; stems creeping below, 6 to 18 in. long, slender or stoutish, softly villous with spreading white hairs. *Leaves* ovate or ovate-oblong, obtuse or sub-acute, margin crenate-serrate; both surfaces softly villous with white glistening hairs; nerves 3 to 4 pairs, oblique, ascending; length 1 to 1.5 in., width .5 to .75 in.; petiole short, .2 in. long or less. *Flowers* on axillary pedicels or in axillary or terminal racemes, the pedicels slender, softly villous, .25 to .75 in. long. *Sepals* subulate-lanceolate, softly villous with white hairs, .4 to .5 in. long. *Corolla* .5 to .6 in. long, tube white, upper lip brown and lower lip yellow. *Stamens* with filaments hirsute below, the upper pair with orbicular basal processes. *Capsule* oblong, .2 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 281. *Tittmannia hirta*, Benth. in Wall. Cat. 3948.

SELANGOR: Rawang, *Ridley* 7605!—DISTRIB. Eastern Himalaya, S. China, Indo-China, Sumatra, Java.



4. *VANDELLIA SCABRA*, Benth. Scroph. Ind. 36. A slender diffusely branched herb with rather rigid stems and branches, the latter 2 to 4 in. long; more or less clothed everywhere with long white spreading hairs. *Leaves* broadly ovate or ovate-cordate, or orbicular, serrate or entire, acute or obtuse; lamina .3 to .6 in. long, .3 in. wide. *Flowers* axillary or terminal, on slender capillary pedicels .5 to 1.5 in. long, strict, spreading in fruit, much longer than calyx. *Sepals* lanceolate, hirsute or glabrous, .1 in. long. *Corolla* .3 in. long. *Capsule* orbicular .1 in. long. DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 692; Griff. Notul. IV. 122, and Ic. Pl. Asiat. t. 418, f. 4; Hook. f. Flor. Brit. Ind. IV. 281. *V. monmierioides*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Torenia hirta*, Cham. & Schlecht. Linnæa II. 571. *T. globosa*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Gratiola pusilla*, Willd. Sp. Pl. I. 105. *Columnnea minuta*, Roxb. Flor. Ind. III. 98. *Tittmannia pusilla*, Benth. in Wall. Cat. 3945 partly. *T. sulcata*, Wight in Wall. Cat. 3946 partly. *Bonnaya VahlII*, G. Don Gen. Syst. IV. 538. *Stemodia minuta*, G. Don Gen. Syst. IV. 542. *Selago pusilla*, Thunb. Prod. Fl. Cap. 99.

MALACCA: *Griffith!* PROV. WELLESLEY: *King!* NEGRI SEMBILAN: Serembam, *Ridley* 10090! SINGAPORE: *King's Collector!* *Ridley!*—DISTRIB. S.E. Asia generally, Africa, Madagascar.

5. *VANDELLIA ELATA*, Benth. Scroph. Ind. 36. A slender, sub-erect or diffuse, glabrous or sparingly hirsute herb; stems simple or dichotomously branched, sometimes rooting near the base; branches slender, 6 to 8 in. long or longer. *Leaves* ovate, coarsely crenate-toothed, acute, base cuneate entire passing into the petiole; lamina .3 to .5 in. long, .25 to .3 in. wide; petiole .15 to .25 in. *Flowers* axillary or terminal, on slender capillary pedicels .3 to .5 in. long, strict, somewhat spreading in fruit, much longer than calyx. *Sepals* narrow-lanceolate, sparingly hirsute, .09 in. long. *Corolla* very small, pale blue, .1 in. long. *Capsule* broadly oblong, .12 in. long, as long as the fruiting sepals. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia elata*, Benth. in Wall. Cat. 3944.

SINGAPORE: *Ridley!*—DISTRIB. Tenasserim, Borneo.

6. *VANDELLIA PEDUNCULATA*, Benth. Scroph. Ind. 37. A slender glabrous herb, stem sometimes creeping at the base; branches slender, 4 to 10 in. long, prostrate. *Leaves* ovate, obtuse or sub-acute, obscurely crenate-toothed, .5 to 1 in. long, .4 in. wide, shortly petioled. *Flowers* axillary and in terminal racemes; pedicels slender 1.5 in. long, usually twice as long as leaves or longer. *Sepals* 5, narrowly lanceolate, free almost to the base, .25 in. long. *Corolla* white, or pale blue with a white spot. *Capsule* linear-lanceolate, .5 in. long. DC. Prod. X. 416;

Griff. Notul. IV. 120; Ic. Pl. Asiat. t. 418, f. 2; Hook. f. Flor. Brit. Ind. IV. 292. *V. Roxburghii*, G. Don Gen. Syst. IV. 549. *V. cordifolia*, G. Don. Gen. Syst. IV. 549. *Gratiola cordifolia*, Vahl Enum. I. 97; Don Prod. 85. *Bonnaya cordifolia*, Spreng. Syst. I. 42. *Tittmannia grandiflora*, Benth. in Wall. Cat. 3949. *Torenia diffusa*, Roxb. Fl. Ind. II. 95. *T. varians*, Griff. Notul. IV. 125 (not of Roxb.).

MALACCA: *Hervey*! SINGAPORE: *King's Collector*! *Thomson*! *Ridley*! JOHORE: *Ridley*! PERAK: *Wray*! *Scortechini*! *Ridley*! PENANG: *Curtis*!—DISTRIB. S.E. Asia generally.

### 8. ARTANEMA, Don.

Herbs with rather tall, erect, angled stems. *Leaves* opposite, entire or serrate, scabrid above as are the stem-angles. *Flowers* large, blue, pink or white, in terminal racemes; bracts leafy; bracteoles obsolete. *Calyx* 5-partite; lobes acuminate, smooth, much dilated. *Corolla* 2-lipped; upper lip outmost, erect, broad, emarginate; lower 3-lobed, spreading; throat not plicate; tube wide-cylindric. *Stamens* 4, didynamous; posterior pair short included, anterior pair long with arching filaments dilated at the base; anther-cells confluent at their tips. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose septicidal capsule; valves 2, separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species 3 to 4, in tropics of Eastern Hemisphere and Australia.

Leaves shortly petioled; flowers over .5 in. long ..	.. 1. <i>A. sesamoides</i> .
Leaves sessile, narrower; flowers under .5 in. long..	.. 2. <i>A. angustifolium</i> .

1. ARTANEMA SESAMOIDES, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* shortly petioled, lanceolate-acuminate, entire or serrate, 2 to 4 in. long, .75 to 1.25 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .3 to .5 in. long, usually slightly exceeding the calyx. *Calyx* of 5 sub-equal lobes, .25 to .3 in. long. *Corolla* blue, .75 in. long. *Capsule* globose, .3 in. in diam. DC. Prod. X. 408; Wight Ic. t. 1410; Miq. Flor. Ind. Bat. II. 686; Hook. f. Flor. Brit. Ind. IV. 274. *Columnea longifolia*, Linn. Mant. 90. *Achimanes sesamoides*, Vahl Symb. II. 71. *Diceros longifolius*, Pers. Synops. II. 164; Bl. Bijdr. 751; Wall. Cat. 3884.

PENANG: Pulo Boutong, *Curtis*!—DISTRIB. S.E. Asia generally.

2. ARTANEMA ANGUSTIFOLIUM, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* sessile, lanceolate to linear-lanceolate, 3 to 4 in. long, .25 to .75 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .15 in. long, always shorter than the calyx. *Calyx* of 5 sub-equal sepals, .2 in. long. *Corolla* pale blue and white, or pink or white, .3 to .4 in.

long. *Capsule* globose, .2 in. in diam. DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Diceros angustifolius*, Wall. Cat. 3885.

PENANG: J. Scott! Ridley 9412! PERAK: Scortechini! Wray 2246! 2721! King's Collector 3045! PAHANG: Ridley 2165A! SINGAPORE: Wallich 3885! SELANGOR: Sepang, Ridley 7604! JOHORE: Serom, Ridley 11134!

Very nearly related to *A. sesamoides*, which differs chiefly by its larger blue flowers and larger capsules.

#### 9. CURANGA, JUSS.

Herbs, creeping or diffuse. *Leaves* opposite, ovate, crenate. *Flowers* in short terminal or pseudo-axillary racemes; bracts small, leafy; bracteoles 0. *Calyx* deeply 4-partite; upper and lower lobes very large, lateral small and narrow. *Corolla* 2-lipped; upper lip outmost, wide-arched, emarginate; lower longer, spreading, 3-lobed; tube short. *Stamens* 2, only the upper pair perfect, included, inserted on corolla-tube; anthers connate with divaricate cells; lower pair of stamens replaced by 2 clavate staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* an orbicular septicidal capsule, covered by the accrescent calyx-lobes, valves separating from the broad placentiferous septum. *Seeds* many, rugose.—DISTRIB. Species 2, S.E. Asiatic.

CURANGA AMARA, JUSS. Ann. Mus. IX. 320. An annual glabrous herb, with slender straggling divaricate branches, 2 to 3 feet long, rooting at the lower nodes. *Leaves* very bitter, ovate, crenate, obtuse or acute, base truncate rounded or cuneate, entire; blade 2 to 2.5 in. long, 1.5 to 2 in. wide; petiole very slender, .5 to .75 in. long. *Flowers* in short, few-flowered racemes, 2 to 2.5 in. long; pedicels .25 to .3 in., in fruit .5 in. long. *Calyx* with the outer sepals broadly ovate-cordate, membranous, reticulate, in flower .25 in., in fruit .5 in. long. *Corolla* brownish-red. *Capsule* small, compressed, .15 in. across. Benth. in DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Caranga amara*, Vahl Symb. I. 100. *Gratiola amara*, Roxb. Flor. Ind. I. 136. *Herpestis amara*, Benth. Scroph. Ind. 30. *Symphillium torenioides*, Griff. in Madr. Journ. Nat. Sc. IV. 1, t. 11. *Treisteria assamica*, Griff. Notul. IV. 111. Rumph. Herb. Amboin. V. t. 170, f. 1.

PERAK: Scortechini 499B! Ridley 9742! PAHANG: Ridley 1346! SELANGOR: Ridley 8214!—DISTRIB. East Himalaya, Indo-China, Malaya, Philippines.

#### 10. BONNAYA, Link & Otto.

Herbs, annual, glabrous. *Leaves* opposite, serrate or entire. *Flowers* solitary axillary, often passing into terminal racemes; bracteoles 0.

*Calyx* 5-partite; segments narrow, faintly imbricate. *Corolla* 2-lipped; upper lip outmost, erect, concave, 2-fid; lower larger, spreading, 3-lobed; tube cylindric. *Stamens* 2; upper pair alone perfect, sub-included; anthers contiguous, the cells divaricate; lower pair represented by 2 obtuse, glandular, entire staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a narrow, exserted, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose. —DISTRIB. Species about 10, in tropics of Eastern Hemisphere.

Leaves sharply, closely, deeply serrate:—

Leaves sessile; flowers white or pink; stems green .. 1. *B. brachiata*.

Leaves petioled; flowers purple; stems reddish .. 2. *B. reptans*.

Leaves remotely, shallowly serrate, or sub-entire; flowers violet-purple:—

Leaves narrow-oblong .. .. 3. *B. veronicaefolia*.

Leaves lanceolate .. .. { 3b. *veronicaefolia*,  
VAR. *verbenaeifolia*.

1. BONNAYA BRACHIATA, Link & Otto, Ic. Pl. Sel. I. 25, t. 11. An erect rather rigid herb, 4 to 10 in. high; branches diffuse divaricate, the lowest decumbent below. *Leaves* oblong, obtuse or acute, margins thickened and sharply closely deeply serrate with teeth mucronate; lamina .5 to 1.5 in. long; pedicels rigid about .25 in. long; bracts small. *Calyx* of 5 nearly free sepals .25 in. long. *Corolla* white or pink, .25 in. long. *Capsule* slender, spreading or erect, .5 to .6 in. long. Benth. in Wall. Cat. 3855, Scroph. Ind. 32, and DC. Prod. X. 420; Miq. Flor. Ind. Bat. II. 695; Hook. f. Flor. Brit. Ind. IV. 284. *B. serrata*, Griff. Notul. IV. 108. *B. pusilla*, Benth. Scroph. Ind. 33; Wall. Cat. 3861. *Gratiola serrata*, Roxb. Flor. Ind. I. 139, and ed. Carey & Wall. I. 140. Rheede, Hort. Malab. IX. t. 59.

SINGAPORE: Wallich! PAHANG: Ridley!—DISTRIB. India, Indo-China, China, Malaya, Philippines.

Wallich's Singapore specimen and one of Ridley's from Pahang belong to the form distinguished by Benth. as *B. pusilla*; another Pahang gathering (Ridley 2163) consists of genuine *B. brachiata*, from which, however, *B. pusilla*, though separable as a marked form, is hardly separable as a variety.

2. BONNAYA REPTANS, Spreng. Syst. I. 41. A prostrate creeping slender herb with reddish stem, branches and leaves beneath; branches diffuse spreading often 12 in. long. *Leaves* in distant pairs, obovate-oblong, obtuse, margins thickened and sharply serrate with mucronate teeth; base narrow-cuneate passing into a petiole .25 in. long; blade .75 to 1.25 in. long, .5 in. wide. *Flowers* opposite in terminal racemes sometimes 3 to 4 in. long; pedicels rigid, .25 in. long; bracts small.



*Calyx* of 5 nearly equal sepals, .3 in. long. *Corolla* purple, .75 in. long. *Capsule* very slender, spreading, 1 in. long. Benth. in DC. Prod. X. 420; Wall. Cat. 3856; Hook. f. Flor. Brit. Ind. IV. 284. *B. ruelloides*, Spreng. Syst. I. 41. *B. ciliata*, Spreng. Syst. I. 41. *Gratiola ciliata*, Koenig in Vahl Symb. I. 97. *G. ruelloides*, Koenig in Vahl Symb. I. 99. *G. reptans*, Roxb. Flor. Ind. I. 140. *Henckelia Roxburghiana*, Dietr. Sp. Pl. I. 572.

PENANG: *Curtis*! PERAK: *Scortechini*! WRAY! PROVINCE WELLESLEY: *Ridley* 6985! PAHANG: *Ridley*! SINGAPORE: *Hullett*! *Ridley*!—DISTRIB. E. Himalaya, India, Indo-China, Malaya, Philippines.

3. BONNAYA VERONICÆFOLIA, Spreng. Syst. I. 41. A flaccid decumbent or creeping herb, with ascending branches 4 to 8 in. long. *Leaves* sub-sessile or narrowed into a short petiole, oblong or oblong-lanceolate or obovate, or lanceolate, obtuse or acute, margin distantly serrate or sub-serrate or sub-entire. *Flowers* opposite, in terminal leafy or naked racemes sometimes up to 6 in. long usually much shorter, pedicels rather flaccid, .25 in. to .35 in. long; bracts leafy or small. *Calyx* of 5 nearly equal sepals .2 in. long. *Corolla* violet-purple, .25 to .35 in. long. *Capsule* slender, sub-erect or spreading, .5 to .6 in. long.

VAR. *typica*. *Leaves* usually obtuse, sometimes acute, always distantly serrate, 1 to 2 in. long, .5 in. wide; racemes usually with leafy bracts; *corolla* .25 in. long. *B. veronicæfolia*, Wall. Cat. 3857; Benth. in DC. Prod. X. 421; Wight Ic. t. 1411; Miq. Flor. Ind. Bat. II. 696; Hook. f. Flor. Brit. Ind. IV. 285. *B. marginata*, Spreng. Syst. I. 41. *B. rigida*, Benth. in Wall. Cat. 3859. *B. procumbens*, Benth. in Wall. Cat. 3860. *B. Rothii*, Dietr. Sp. Pl. I. 556. *B. bracteata*, Griff. Notul. IV. 107. *Gratiola veronicæfolia*, Retz Obs. IV. 8; Roxb. Pl. Corom. II. 30, t. 154; Fl. Ind. I. 138; ed. Carey & Wall. I. 139. *G. marginata*, Colsm. in Vahl Enum. I. 98. *G. racemosa*, Roth Nov. Sp. 9.

PENANG: Balli Pulo, George Town, &c. *Deschamps*! SINGAPORE: *King's Collector*! PAHANG: *Ridley*! MALACCA: *Hervey*! SELANGOR: *Ridley*! JOHORE: Serom, *Ridley*!—DISTRIB. Throughout S.E. Asia.

VAR. *verbenæfolia*, Hook. f. Flor. Brit. Ind. IV. 285. *Leaves* acute or sub-acute, distantly shallowly serrate or sub-entire, 1 to 1.5 in. long, .2 to .25 in. wide; racemes usually marked with minute bracts; *corolla* .35 in. long. *B. verbenæfolia*, Benth. in DC. Prod. X. 421; Wall. Cat. 3858; Wight, Ic. t. 1412. *B. Roxburghiana*, Dietr. Sp. Pl. I. 559. *B. cyanea*, Griff. Notul. IV. 107. *Gratiola verbenæfolia*, Colsm. in Vahl Enum. I. 96. *G. ciliata*, Colsm. in Vahl Enum. I. 97. *G. racemosa*, Roxb. Fl. Ind. I. 138, and ed. Carey & Wall. I. 139. *G.*

*Roxburghiana*, Roem. & Schult. Syst. I. 123. *Tittmannia Colsmanni*, Benth. in Wall. Cat. 3950. *Torenia gracilis*, Benth. in Wall. Cat. 3952.

MALACCA: *Hervey*! PENANG: *Curtis*! PERAK: *Ridley*! *Scortechini*!—DISTRIB. Throughout S.E. Asia.

#### 11. SCOPARIA, Linn.

Undershrubs or herbs with twiggy branches. *Leaves* opposite or whorled, glabrous or pubescent, entire or toothed, punctate. *Flowers* small, white or yellow, axillary, solitary or 2-nate; bracteoles 0. *Calyx* small, 4-5-partite; lobes imbricate. *Corolla* small, rotate, 4-lobed; lobes imbricate, sub-equal, obtuse; throat densely bearded; tube very short. *Stamens* 4, sub-equal; filaments filiform; anthers sub-sagittate, cells diverging or parallel, discrete. *Ovary* 2-celled; ovules in each cell numerous; style sub-clavate; stigma truncate or emarginate. *Fruit* a small, ovoid or globose, septicidal capsule; valves membranous, with inflexed margins, separating from the placentiferous septum. *Seeds* many, small, obovoid, angular, scrobiculate.—DISTRIB. Species about 6, all American.

SCOPARIA DULCIS, Linn. Sp. Pl. 116. A glabrous much-branched erect or ascending leafy undershrub with a strong perennial woody rootstock; stems 6 in. to 3 ft. high. *Leaves* opposite or ternate, lanceolate or elliptic-lanceolate, 1 to 2 in. long, .5 to 1.5 in. wide, serrate, acute or obtuse, narrowed to a short petiole. *Flowers* many minute in terminal panicles; pedicles slender, strict, .25 to .4 in. long. *Sepals* 4, oblong. *Corolla* white, .12 in. in diam., tube very short. *Stamens* sub-equal. *Capsule* globose, .15 in. in diam. Voigt Hort. Suburb. Calcutt. 507; Benth. in DC. Prod. X. 431; Gaertn. Fruct. I. 251, t. 53, f. 10; Miq. Flor. Ind. Bat. II. 699; Hook. f. Flor. Brit. Ind. IV. 289.

PENANG: Kampai, Batu Gaja, &c., *King*! *Deschamps*! *Curtis*! SELANGOR: *Ridley*! PERAK: *Scortechini*! SINGAPORE: *Hullett*! *Kurz*! *King's Collector*! *Deschamps*!—DISTRIB. Everywhere in the tropics; originally American.

#### 12. STRIGA, Lour.

Herbs, semiparasitic on roots, usually scabrid, discoloured when dry. *Leaves* opposite below, alternate above, linear, entire or rarely toothed sometimes reduced to scales. *Flowers* axillary, or the upper in bracteate spikes; bracteoles usually 2. *Calyx* 5-toothed or 5-fid, 5- or 10- or 15-ribbed, tubular. *Corolla* 2-lipped; upper lip inner in bud,

usually shortly 2-fid or emarginate, lower 3-lobed; limb spreading; tube slender abruptly incurved at or above the middle. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse; connective sometimes mucronate. *Ovary* 2-celled; ovules in each cell numerous; style thickened upwards; stigma entire. *Fruit* an oblong or globose loculicidal capsule; valves entire, firm, septiferous, separating from the placentas. *Seeds* many, small, ovoid or oblong, reticulated.—DISTRIB. Species 20, in the tropics of the Eastern Hemisphere.

STRIGA LUTEA, Lour. Flor. Cochinchin. 22. A slender, erect, simple or fastigiate branched herb, 6 to 18 in. high; leaves and stems scabrid or villous. *Leaves* linear, .5 to 1.5 in. long, .12 in. wide. *Flowers* in elongated, usually interrupted spikes, 2 to 6 in. long; bracts usually exceeding the calyx, linear-lanceolate, scabrid. *Calyx* 10-ribbed, .25 in. long, teeth 5, sub-equal. *Corolla* white or yellow or pink or purple, .5 in. long, glabrous, incurved; upper lip emarginate reflexed; lower lip 3-lobed spreading. *Capsule* oblong, grooved, shorter than the calyx. Benth. in Hook. Comp. Bot. Mag. I. 363; Hook. f. Flor. Brit. Ind. IV. 299. *S. hirsuta*, Benth. in DC. Prod. X. 502; Dalz. & Gibs. Bomb. Flor. 181. *S. coccinea*, Benth. in DC. Prod. X. 364. *S. phœnicea*, Benth. in DC. Prod. X. 364. *Buchnera asiatica*, Linn. Sp. Pl. 630 partly; Roxb. Fl. Ind. III. 31; Benth. Scroph. Ind. 40. *B. coccinea*, Benth. Scroph. Ind. 40, Wall. Cat. 3870. *B. phœnicea*, Benth. Scroph. Ind. 40; Wall. Cat. 3874. *Campuleia coccinea*, Hook. Flor. Exot. t. 203. Rheede Hort. Malab. IX. t. 66.

PENANG: Curtis 1840! PAHANG: Ridley! SINGAPORE: Ridley 139; Kurz! ANDAMANS: Port Blair, King! Prain!—DISTRIB. Throughout S.E. Asia, Arabia, Madagascar, Africa.

### 13. CENTRANTHERA, R. Br.

Herbs, semiparasitic, annual, rigid, scabrous. *Leaves* opposite throughout, or opposite below alternate above, oblong or linear, obtuse, entire or toothed. *Flowers* axillary, or in bracteate spikes or racemes; bracteoles 2. *Calyx* compressed, spathaceous, split on one side, acuminate entire, or shortly 3-5-lobed on the other. *Corolla* 5-lobed; lobes sub-equal, spreading, the 2 upper inmost in bud; limb oblique; tube long, incurved. *Stamens* 4, didynamous, included; anthers contiguous in pairs; cells transverse, spurred or mucronate at base, one cell often sterile. *Ovary* 2-celled; ovules in each cell numerous; style simple, dilated above; stigma acute, linguiform. *Fruit* an ovoid or sub-globose loculicidal capsule; valves entire, carrying away the

placentas. *Seeds* many, small, oblong-cuneate; testa lax, reticulate.—  
DISTRIB. Species 4–5, E. Asiatic and Australian.

CENTRANTHERA HUMIFUSA, Wall. Cat. 3883. A dwarf herb, diffusely branching from the base, hispid or glabrous, branches 3 to 6 in. long. *Leaves* linear, entire, .5 to .75 in. long. *Flowers* in terminal spikes, sub-sessile; bracts small. *Calyx* ovoid, sub-acute, .15 in. long. *Corolla* yellow, .3 to .5 in. long, incurved. *Capsule* sub-globose, .15 in. wide. Benth. in DC. Prod. X. 525; Hook. f. Flor. Brit. Ind. IV. 301. *Razumovia tranquebarica*, Spreng. Syst. II. 812. *Torenia lepidota*, Roth Nov. Sp. 281.

MALACCA: Griffith! SINGAPORE: Kurz!—DISTRIB. China, Indo-China, India, Malaya.

#### Order LXXXIV. OROBANCHACEÆ.

[By D. PRAIN.]

Root-parasites, annual, white or reddish. *Stem* simple or branched, stout or slender, clothed with leaf-scales. *Leaves* proper 0. *Flowers* solitary or in spikes or racemes, irregular. *Sepals* 4–5, usually connate in a variously toothed or spathaceous calyx, rarely free. *Corolla* hypogynous, 2-lipped; upper lip vaulted, lower lip 3-lobed; throat often with 2 villous folds; tube curved. *Stamens* 4, didynamous, inserted on corolla-tube; anthers 1–2-celled; cells spurred at the base, dehiscence by slits or basal pores; one cell sometimes imperfect. *Disk* unilateral or glandular or obsolete. *Ovary* of 2 connate carpels, usually 1-celled; style long, tip curved; stigma 2-lobed, sub-capitate; ovules usually numerous on generally 2 pairs of free or confluent parietal placentas which sometimes meet in the axis of the ovary. *Capsule* 1-celled, 2-valved; *seeds* usually many, minute, with a pitted or tubercled, rarely reticulate and lax testa; albumen fleshy; embryo ovoid, entire or 2-fid.

#### ÆGINETIA, Linn.

Leafless parasitic herbs with simple or branched naked or scaly stems or scapes. *Flowers* few, large, solitary or corymbose; bracteoles 0. *Calyx* spathaceous, split in front almost to the base. *Corolla* incurved, campanulate-tubular; limb obscurely 2-lipped, lobes somewhat spreading, the two upper lobes (upper-lip) connate. *Stamens* included; anthers with one perfect cell adnate to filament and not spurred; the other cell absent in upper anthers, empty clavate and deflexed in the lower. *Ovary* 1-celled; placentas large, 2-lobed or multifid, filling the chamber, ovuliferous throughout; style slender;



stigma large peltate. *Capsule* partially 2-valved. *Seeds* many, small, crowded; testa pitted.—DISTRIB. Species 3, S.E. Asiatic.

*ÆGINETIA PEDUNCULATA*, Wall. Pl. As. Rar. III. 13, t. 219. A leafless herb, 3 to 6 in. high; stems red or yellow, parasitic on roots, buried, emitting several short stout fleshy several-flowered scapes with alternate peduncled flowers; peduncles 1 to 4 in. long, stout, bracteate at base; bracts .25 to .35 in., ovate, obtuse. *Calyx* 1.5 to 2 in. long, fleshy, dull-pink at length yellowish-white, with a mucilaginous pad surrounding base of corolla, tip acute or obtuse. *Corolla-tube* yellow or white, the lobes violet or claret-coloured, crenate and erose. *Stamens* didynamous, anthers of lower pair with a large dorsal fleshy decurved horn. *Ovary* 1-celled, placentas 2, each of 2 plates; stigma cordate-peltate. *Capsule* ovoid. *Seeds* brown. Reut. in DC. Prod. XI. 43; Wight Ill. t. 158B, f. 6; Ic. t. 1421; Hook. f. Flor. Brit. Ind. IV. 320. *Æ. abbreviata*, Ham. in Wall. Cat. 3965; Benth. Scroph. Ind. 95; Reut. in DC. Prod. XI. 43. *Æ. acaulis*, Walp. Rep. III. 481; Reut. in DC. Prod. XI. 43. *Orobanche pedunculata*, Roxb. Hort. Beng. 45; Fl. Ind. iii. 29. *O. acaulis*, Roxb. Cor. Pl. III. 89, t. 292, and Fl. Ind. III. 29.

PERAK: Batang Padang Valley, 2,000 feet; Wray 1456! 1457!—DISTRIB. India, Indo-China, Java, Sumatra.

One of Wray's specimens is attached to the rhizome of a *Kempferia*.

#### CHRISTISONIA, Gardn.

Low fleshy scaly parasitic herbs, with yellow or white or rose-purple flowers; stems simple or tufted from a short or long rootstock; scales alternate, obtuse or acute. *Flowers* densely or laxly corymbose; bracteoles 2 or 0. *Calyx* tubular, terete or angular, 2-5-lobed or toothed. *Corolla-tube* long, inflated or funnel-shaped, slightly or distinctly curved, 5-lobed, obscurely to distinctly 2-lipped, the two upper lobes (in our species outer in bud) sub-erect, the lower spreading. *Stamens* 4, included or sub-exserted; filaments stout; anthers with one perfect cell and one imperfect, one pair sometimes spurred or appendaged; rarely with both cells perfect. *Disk* 0. *Ovary* 1-celled with two 2-partite placentas, or 2-celled from the placentas meeting in the axis; style long, tip incurved, stigma large, 2-lobed, the upper lobe very small or obsolete, the lower (sometimes the only one present) very large orbicular or clavate; ovules numerous. *Capsule* ovoid or sub-globose, loculicidal. *Seeds* minute, crowded, many perfect with striate testa, others imperfect with lax testa; embryo half as long as the albumen.—DISTRIB. Species 12, tropical Asiatic.

CHRISTISONIA SCORTECHINII, Prain in Journ. As. Soc. Beng. LXXIII. 2. 205. *Stem* short hypogæal, covered with linear scales. *Flowers* 3 to 8, crowded in a dense corymb; some shortly peduncled, others sessile, each with an oblong cucullate basal bract .75 in. long; all parts loaded with sticky mucilage. *Calyx* spathaceous, rupturing into usually 2 (sometimes, *vide* Scortechini, into 2 to 4) lobes, in the fully opened flower with tube 1 in., lobes .25 in. long. *Corolla-tube* white, with a yellow line inside in front, 2 in. long, infundibuliform and curved above, the lower part narrow-cylindric 1 in. long; limb 2-labiate, upper lip outmost in bud, erect, 2-lobed, lower lip 3-lobed, spreading. *Stamens* didynamous; anthers all conniving; filaments glabrous, inserted below middle of corolla-tube, 1-celled, adnate to the enlarged filament, upper pair without, lower with an empty oblong pointed cell. *Disk* 0. *Ovary* glabrous, 1-celled, placentas 2, 2-fid, uniformly covered with ovules; style glabrous downwards; stigma peltate, flat, .2 in. in diam.

PERAK: *Scortechini*, 2121!

#### Order LXXXV. LENTIBULARIACEÆ.

[By D. PRAIN.]

Marsh or aquatic herbs, or occasionally growing on wet rocks. *Leaves* radical, rosulate or when submerged capillary-multifid, sometimes obsolete. *Flowers* irregular, hermaphrodite, on 1-many-flowered simple or branched scapes; bracts small, sometimes 0; bracteoles under calyx 2 or 0. *Calyx* inferior, 2-5-lobed. *Corolla* 2-lipped and spurred; upper lip usually the smaller, entire or emarginate; lower lip 3-6-lobed. *Stamens* 2, adnate to the base of the corolla, alternate with the lobes of the lower lip; filaments widely curving, anther-cells ovate, transversely confluent; dehiscence longitudinal. *Carpels* 2, connate in a superior, globose, 1-celled ovary; ovules very many, on a free basal placenta; style short; stigma unequally 2-lobed. *Fruit* a globose 2-4-valved, or irregularly rupturing capsule. *Seeds* very many, minute; albumen 0.—DISTRIB. Species nearly 200, in all parts of the world.

#### UTRICULARIA, Linn.

Herbs, often very small, submerged or floating, or growing on wet rocks. *Leaves* in submerged or floating species multifid, with capillary segments, in erect or twining species entire, often disappearing at time of flowering, frequently with minute bladders. *Flowers* on simple or branched scapes, racemes few- or many-flowered; bracts and 2 bracteoles

distinct. *Calyx* 2-partite; lobes entire or nearly so, often accrescent. *Corolla* 2-lipped; upper lip entire or emarginate; lower larger 3-6-lobed; tube with a straight or curved spur. *Stamens* 2, adnate to base of corolla, alternate with lobes of lower lip; filaments broad; anthers ovate, 2-celled, or by confluence almost 1-celled. *Carpels* connate in a globose 1-celled ovary; ovules many, on a central placenta; style short; stigma unequally 2-lobed. *Capsule* globose, regularly 2-4-valved, or opening irregularly. *Seeds* many, small; albumen 0.—*DISTRIB.* Species 150, in most countries.

Leaves many, submerged, scattered, divided into numerous capillary segments mostly interspersed with bladders; calyx-lobes equal or nearly so; pedicels not winged:—

Flowers yellow to pale-yellow or nearly white:—

Peduncles very slender; flowers usually two, never more than three, always under .25 in. across; pedicels in fruit erect: sometimes the capillary leaves absent .. ..

1. *U. exoleta*.

Peduncles stout; flowers usually more than three, and always from .35 to .5 in. across; pedicels reflexed in fruit and thickened under the calyx .. ..

2. *U. flexuosa*.

Flowers blue or red or pink; pedicels erect in fruit .. ..

3. *U. punctata*.

Leaves few, rosulate at base of stem:—

Leaves linear or linear-spathulate, usually absent at time of flowering; calyx-lobes equal or nearly so; seeds not glochidiate:—

Scales of the scape and bracts attached by their bases:—

Stems erect:—

Flowers yellow; pedicels in fruit distinctly winged .. ..

4. *U. bifida*.

Flowers pink, purple, or violet, rarely white with lilac markings:—

Pedicels in fruit slightly winged; sometimes a few leaves still present at time of flowering; stems 8 to 12 in. high, stoutish .. ..

5. *U. affinis*

VAR. *Griffithii*.

Pedicels in fruit capillary, short, wingless; leaves 0 at time of flowering; stems 2 to 3 in. high, very slender .. ..

6. *U. minutissima*.

Stems twining; flowers yellow:—

Stems slender, leaves absent at time of flowering; lower lip less than .25 in. wide .. ..

7. *U. Wallichiana*.

Stems stouter; leaves forming matted masses; lower lip over .3 in. wide .. ..

8. *U. involvens*.

Scales of the scape and bracts produced downward below point of attachment:—

Flowers on distinct pedicels as long as the fruiting calyx or longer; capsule longer than fruiting calyx-lobes; flowers pink (*Ridley*) .. ..

9. *U. verticillata*.

Flowers almost or quite sessile; capsule hidden by the fruiting calyx-lobes:—

Flowers few, scattered on the very slender scapes; corolla white .. ..

10. *U. racemosa*

VAR. *filiculais*.

Flowers many or few, congested at the ends of the  
stouter rigid scapes and branches; corolla rarely pure  
white .. .. .

.. 11. *U. ophirensis*.

Leaves orbicular or spatulate-orbicular, persistent; calyx-lobes  
very unequal, the upper the larger; seeds glochidiate; stems  
very slender, lip pale-violet or white with a yellow centre .. 12. *U. orbiculata*.

1. *UTRICULARIA EXOLETA*, R. Br. Prod. 430. A water-weed, sometimes floating with very slender stems and submerged divided capillary leaves, the segments interspersed with bladders; sometimes growing in mud with capillary leaves absent and with tufted setaceous leaves. *Scapes* slender, naked, or with one or two scale-like bracts, 2 to 4 in. long, usually 2-flowered, occasionally 3-flowered, sometimes 1-flowered, then often with an abortive axis or flower-bud opposite the bract; pedicels slender, erect, the lowest ultimately  $\frac{1}{4}$  in. long; bracts very small, obtuse, basifixed; bracteoles 0. *Calyx* 2-lobed; lobes slightly unequal, ovate-obtuse or sub-orbicular, in fruit adpressed to the capsule,  $\frac{1}{4}$  in. long. *Corolla* yellow,  $\frac{1}{2}$  in. across; spur cylindric-conical, twice as long as lower calyx-lobe and slightly exceeding lower lip of corolla, which has an entire margin and embraces the base of the spur. *Capsule* almost globose,  $\frac{1}{15}$  in. in diam. *Seeds* sub-trapezoid-discoïd, margin thin, spreading, minutely crenulate. A. DC. Prod. VIII. 7; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. diantha*, Roem. & Schult. Syst. Veg. I. 169; Wight Ic. t. 1569; Oliv. Journ. Linn. Soc. III. 175. *U. difflora*, Roxb. Hort. Beng. 4. *U. biflora*, Roxb. Fl. Ind. I. 143, nec alior. *U. Roxburghii*, Spreng. Syst. I. 52. *U. elegans*, Wall. Cat. 1502. *U. pterosperma*, Edgew. Proc. Linn. Soc. I. 352.

PERAK: Sunga Ryah, *King's Collector* 891! 4383! *Ridley*! SINGAPORE: *Ridley*. PROV. WELLESLEY: *Ridley*! JOHORE: Parit Lombong, *Ridley*! PAHANG: Kwala Pahang, *Ridley*! NICOBARS: Kamorta, *Kurz*! —DISTRIB. S.E. Asia, N. Australia.

2. *UTRICULARIA FLEXUOSA*, Vahl Enum. I. 198. A floating water-weed with submerged divided capillary leaves, the segments interspersed with bladders; occasionally with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, scattered or sometimes whorled near or occasionally above the base of the scapes. *Scapes* 3 to 10 in. long, 3-12-flowered; pedicels stout, reflexed, and slightly thickened under the calyx in fruit, ultimately  $\frac{3}{8}$  to  $\frac{5}{8}$  in. long; bracts ovate-acute, basifixed; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-sub-acute, in fruit patent,  $\frac{1}{25}$  in. long. *Corolla* yellow, rarely white,  $\frac{3}{8}$  to  $\frac{5}{8}$  in. across; spur somewhat longer than lower calyx-lobe, and about as long as lower lip of corolla, stoutish, bluntish, straight or somewhat curved. *Capsule* compressed, sub-globose,  $\frac{1}{25}$  in.



long. *Seeds* thickly discoid, margin thin, incurved towards the concave face, usually 5-6-angled. Bl. Bijdr. 739; A. DC. Prod. VIII. 24; Oliv. Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. australis*, R. Br. Prod. 430; A. DC. Prod. VIII. 6. *U. fasciculata*, Roxb. Fl. Ind. I. 143; Wall. Cat. 1499; A. DC. Prod. VIII. 7; Wight Ic. t. 1568; Miq. Flor. Ind. Bat. Suppl. 246. *U. confervifolia*, Don Prod. 84; A. DC. Prod. VIII. 8. *U. inæqualis*, Benj. Linnæa XX. 304. *U. Blumei*, Miq. Fl. Ind. Bat. II. 994. *U. extensa*, Hance in Walp. Ann. III. 3.

MALACCA: *Ridley*! PAHANG: Kwala Pahang, *Ridley*! PERAK: *Scortechini*! Durian S. Batang, *King's Collector* 1036! SINGAPORE: *Ridley* 5642, 9844! KEDAH: Langkawi, *Curtis*!—DISTRIB. S.E. Asia, N. Australia.

*Forma gracilis*, Oliv. Journ. Linn. Soc. III. 175 (= *U. inæqualis*, Benj.) more slender in all its parts and with smaller paler yellow flowers.

SINGAPORE: *King's Collector* 1165! *Hullett* 36! 385! MALACCA: *Cunning*! *Goodenough* 1407! *Ridley*! PROV. WELLESLEY: *Ridley*!

The very similar and nearly allied *U. stellaris*, distinguished most easily by the presence of a cluster of oblong vesicles about the middle of the peduncle, has not been reported so far from the Malayan Peninsula.

*King's Collector's* field-note on the slender form, which the writer agrees with Oliver in considering no more than a form of *U. flexuosa*, is as follows: "Herbaceous plant, in clear pools of fresh water; colour bright green. Flowers pale yellow. I sent a similar one from Durian S. Batang, but I don't think the same." His field-note on genuine *U. flexuosa* is as follows: "Growing in muddy pools of water; colour a dark reddish-brown, tinged with green; flower bright yellow."

In his interesting paper on the *Utricularias* of the Malay Peninsula (*Journ. Bot.* for 1895, pp. 10, 11) Mr. *Ridley* gives as localities for *U. flexuosa* Pahang and Kedah, Langkawi, but does not differentiate the two forms. The leaves, he remarks, are used in medicine by the Malays, who call it Lumut Ekor Kuching (Cat's Tail Moss) or Lumut Ekor Kuning (Yellow Tail Moss).

3. *UTRICULARIA PUNCTATA*, Wall. Cat. 2121. A floating water-weed, with submerged divided capillary leaves, the segments interspersed with bladders, often with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, near the base of the scapes. *Scapes* 4 to 12 in., usually many-flowered; pedicels slender, ascending or sub-erect in fruit, ultimately .5 to .6 in. long; bracts ovate, more or less acute, slightly produced beyond base; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-rotund, obtuse, .1 in. long. *Corolla* blue, reddish-purple or pink, .25 in. across, spur somewhat longer than lower calyx-lobe, shorter than lower lip of corolla, thick, sub-cylindric, obtuse. *Capsule* thin, ovate-oblong, obtuse, .2 in. long. *Seeds* discoid, peltate,

margin winged throughout, wing deeply, sharply toothed. A. DC. Prod. VIII. 5; Wight Ic. t. 1570; Oliv. in Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10.

PAHANG: Chenei Lake, *Fox*!—DISTRIB. Borneo, Tenasserim.

4. *UTRICULARIA BIFIDA*, Linn. Sp. Pl. 26. A slender erect weed of wet places; leaves radical, linear-spathulate, disappearing before flowering, .3 to .5 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 2 to 10 in. long, 2-many-flowered, beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, in flower .12 in., in fruit .2 in. long, recurved and distinctly winged from the decurrent calyx, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate-obtuse, .25 in. long. *Corolla* yellow, .25 in. wide; spur longer than the lower calyx-lobe and as long as the lower lip of the corolla, slightly falcate. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, testa lax, scrobiculate, obliquely striate. A. DC. Prod. VIII. 21; Oliv. Journ. Linn. Soc. III. 182; Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 10. *U. biflora*, Wall. Cat. 1498 (*not of* Roxb.). *U. diantha*, A. DC. Prod. VIII. 21 (*not of* Roem. & Schult.). *U. Wallichiana*, Benj. Bot. Zeit. 1845 214 (*not of* Wight). *U. brevicaulis*, Benj. Linnæa XX. 303.

PENANG: *Curtis*! SELANGOR: *Ridley*! PERAK: Larut, *Scortechini*! Selama, growing among grass in swampy places, *Wray* 4263! *Ridley*! PROV. WELLESLEY: in wet and swampy places, *King's Collector* 1616! SINGAPORE: in wet, sandy hollows, *Kurz* 2973! *Ridley*! MALACCA: *Griffith*! *Hervey*! *Ridley*! PAHANG: Kuala Pahang, *Ridley* 1481! KEDAH: *Curtis*.—DISTRIB. Throughout E. and S.E. Asia.

Mr. Ridley has seen specimens of this species from the Dindings and from Penang, also from Kedah, Langkawi. He finds two rather distinct forms, a small-flowered, plain yellow one and a form with larger flowers over .25 in. long with a darker orange centre; this latter Ridley found in Pahang growing with the common form.

5. *UTRICULARIA AFFINIS*, Wight; var. *Griffithii*, Oliv. Journ. Linn. Soc. III. 179. A slender erect weed of wet places. *Leaves* radical, linear or linear-spathulate, obtuse, very often persisting during flowering, .5 to .7 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 5 to 12 in. long, usually many-flowered; beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, .1 in. long in flower, in fruit .15 in. long and slightly winged by the decurrent calyx, erect or ascending, never recurved and rarely patent, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate or sub-orbicular, acute or sub-cuspidate, .25 in. long. *Corolla* blue with whitish lines, .25 in. wide; spur slightly longer than the lower calyx-

lobe and the lower lip of the corolla. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, reticulate, cells of the testa sub-hexagonal. *U. Griffithii*, Wight Ic. t. 1576; Ridl. Journ. Bot. XXXIII. 10. *U. caerulea*, Benth. Fl. Hongk. 256 (not of Linn.).

MALACCA: *Griffith!* RIDLEY! PERAK: *Scortechini!* SINGAPORE: *Hullett!* RIDLEY!—DISTRIB. China, Burma, Tenasserim, Borneo.

There are only shrivelled leaves on Ridley's and Wight's specimens, which are mostly in fruit; Scortechini's specimens, which are in flower, have numerous radical grassy linear-spathulate obtuse leaves, .5 in. long or rather longer. Mr. Ridley, in all probability rightly, considers that this is entitled to specific rank apart from *U. affinis*.

6. *UTRICULARIA MINUTISSIMA*, Vahl Enum. I. 204. A very small erect weed of wet places; leaves 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* capillary, rigid, branched, 2 to 3 in. long, quite glabrous, or with a few rigid scattered black hairs; racemes 2-5-flowered, beset with a few basifixed ovate-acute empty bracts or scales; pedicels very short, in fruit only .05 in. long, occasionally like the upper calyx-lobe with a few straight black hairs, sub-patent, with small lanceolate basifixed bracts and bracteoles, less than half as long as their pedicels. *Calyx* 2-lobed, lobes sub-equal wide-oblong, obtuse, in fruit .1 in. long. *Corolla* mauve, .15 in. wide; spur wide-conic-cylindric, thrice as long as lower calyx-lobe and twice as long as lower lip of corolla. *Capsule* oblong, .07 in. long, covered by the calyx. *Seeds* minute, ovoid, obscurely scrobiculate. A. DC. Prod. VIII. 16; Oliv. Journ. Linn. Soc. III. 190; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11.

PERAK: Larut, *Scortechini* 1501! PAHANG: Kwala Pahang, *Ridley* 1474c in part! MALACCA: *Koenig*; on Mount Ophir, *Ridley*.

This small plant, collected by Scortechini with no note of colour, and stated by Ridley to have mauve flowers, is here identified with *U. minutissima*, Vahl, from description only. The branched capillary stems render it very like and very liable to be mistaken for small specimens of *U. verticillata*, which has, however, longer pedicels and bracts produced below their point of insertion. The presence of hairs on the stems, pedicels, and sometimes the calyx, at once suggests a reference to *U. hirta*, which is undoubtedly its nearest affinity. The scape, however, appears never to branch in *U. hirta*; the flowers in that species are larger and fewer; the pubescence, too, when present in *U. minutissima*, which is not always the case, is very different, consisting of rigid patent black bristly hairs, whereas in *U. hirta* the hairs are soft and grey or tawny. The seeds of the two species are very similar, but those of *U. minutissima* are smaller and yet have fewer- and larger-meshed sub-hexagonal reticulations.

7. *UTRICULARIA WALLICHIANA*, Wight Ic. t. 1572, fig. 1. A very slender herb growing in wettish fields and damp grassy places; stems

twining, thin, 6 to 8 in. long. *Leaves* linear-spathulate, absent at time of flowering; bladders not seen. *Flowers* small, racemose or subspicate at ends of stems; pedicels sometimes absent, sometimes up to .25 in. long; bracts lanceolate, acute, basifixed. *Calyx-lobes* ovate, acute, .15 in. long, in fruit .2 in. long. *Corolla* yellow; upper lip obovate, lower rounded, .2 in. wide; spur straight or slightly incurved, .2 in. long. *Capsule* sub-globose, enclosed within calyx-lobes, upraised on the sub-erect fruiting pedicels. *Seeds* ellipsoid, scrobiculate but not glochidiate or papillose. Oliv. in Journ. Linn. Soc. III. 182; Clarke in Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 11. *U. scandens*, Benj. in Linnæa XX. 309 chiefly. *U. macrolepis*, Wight Ic. t. 1580, fig. 2. *U. capillacea*, Thw. Enum. 171 (not of Oliv.).

MALACCA: Mount Ophir, at 4,000 feet elevation, growing among grasses, *Ridley*!—DISTRIB. Throughout India.

8. *UTRICULARIA INVOLVENS*, Ridl. Journ. Bot. XXXIII. 11. A tufted herb forming mats of leaves on rocks in streams; stems twining, fairly stout, 12 in. long. *Leaves* thinly membranous, spatulate-linear, obtuse, 1 in. long or longer, .1 in. across. *Flowers* large, racemed at ends of stems; pedicels .5 to .75 in. long; bracts lanceolate, acute, basifixed, .1 in. long. *Calyx-lobes* oblong-ovate, .25 in. long. *Corolla* lemon-yellow; upper lip obovate, lower rounded, 2-lobed, .35 in. wide; spur straight, pendulous, acute or acuminate, .25 in. long. *Capsule* unknown.

KEDAH: Kedah Peak (Gunong Jerai), at 3,000 feet elevation, in streams and wet places, *Ridley*!

A very fine and remarkably distinct species.

9. *UTRICULARIA VERTICILLATA*, Benj. Linnæa XX. 312. A slender erect weed of wet places. *Leaves* 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* slender, sometimes capillary, rigid, branched, 3 to 10 in. long, glabrous; beset with a few ovate scales or empty bracts, acute at both ends and produced downwards beyond point of insertion; pedicels capillary, puberulous, .2 in. long in flower, in fruit .25 in. long; bracts and bracteoles produced below point of insertion. *Calyx* 2-lobed, lobes sub-equal, sub-orbicular, in fruit .1 in. long. *Corolla* (? yellow) .15 in. wide; spur wide-cylindric, slightly exceeding lower lip of corolla. *Capsule* globose, .15 in. in diam., projecting beyond the closely adpressed calyx-lobes. *Seeds* minute, with sub-hexagonal reticulations. Oliv. Journ. Linn. Soc. III. 184; Hook. f. Flor. Brit. Ind. IV. 333; Ridl. Journ. Bot. XXXIII. 10. *U. bifida*, Wight Ic. t. 1584, f. 2 (not of Linn.).



KEDAH : Langkawi, *Curtis* ! MALACCA : *Griffith* ! PAHANG : Kwala Pahang, *Ridley* 1481 in part !

Oliver has suggested that the colour of the corolla in this species is yellow, and the fact that *Ridley* has mixed it (under his n. 1481) with *U. bifida* might be taken as corroborating Oliver's opinion. *Ridley*, in his paper on the Malay Peninsula *Utricularias*, says, however, that the flowers are pink.

10. *UTRICULARIA RACEMOSA*, Wall. ; var. *filicaulis*, Clarke in Flor. Brit. Ind. IV. 333. A slender herb of damp places. *Leaves* linear or spatulate, absent at time of flowering ; roots fibrous, bladders not seen. *Scapes* erect, very slender, 2 to 4 in. high, rarely higher, rather rigid, occasionally with a few branches, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* few scattered sessile ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the longer, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* white, from .15 to .2 in. across ; spur straight, conical or sub-cylindric, longer than lower lip of corolla. *Capsule* globose, .1 in. long, hidden by the adpressed calyx-lobes. *Seeds* minute, obscurely scrobiculate. *U. filicaulis*, Wall. Cat. 1501 ; A. DC. Prod. VIII. 21 ; Oliv. in Journ. Linn. Soc. III. 186. *U. nivea*, Vahl Enum. I. 203 ; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 144 ; Wight Ic. t. 1582. *U. setacea*, Wall. Cat. 6398 partly. *U. campestris*, Miq. in Pl. Hohenack. n. 596. *U. racemosa*, Ridl. Journ. Bot. XXXIII. 10 (*hardly* of Wall.).

MALACCA : Ayer Keroh, *Ridley* 10706 ! PAHANG : Kwala Pahang, *Ridley* 1474A ! SINGAPORE : Changi, *Ridley*. PENANG : Waterfall, *Curtis*, fide *Ridley*.—DISTRIB. Indo-China, India.

This plant probably quite deserves to be considered a species distinct from *U. racemosa*, though except in its usually smaller size and its white instead of blue flowers, there is little to distinguish the two.

11. *UTRICULARIA OPHIRENSIS*, Ridl. Journ. Bot. XXXIII. 10. A herb. *Leaves* linear-spatulate or spatulate, absent at time of flowering ; roots fibrous ; bladders not seen. *Scapes* erect 8 to 16 in. high, slender, rigid, often branching, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* sessile, clustered at the ends of the stems and branches in globose or oblong heads .3 to .5 in. long, .25 in. across ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the larger, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* .25 in. across, variable in colour, the lower lip rose-coloured (*Ridley*), both lips blueish with a yellow

hairy gland in the centre of the lower lip inside (*Scortechini*), or white (*Curtis, Kunstler*), or white with a yellow tinge (*Kunstler*); spur straight with an incurved tip (*Ridley*), or curved ascending (*Scortechini*), .2 in. long. *Capsule* globose or depressed-globose, hidden by the adpressed calyx-lobes, .1 in. long. *Seeds* oblong or obovate, brown, the broad end glochidiate.

PERAK: Larut, *King's Collector* 1931! 3820! Thaipeng, *Wray* 131! *Scortechini* 376! PENANG: Waterfall, *Curtis*! MALACCA: Padang Batu, *Ridley* 10091!

This species, which is here sustained on the authority of Mr. Ridley, who knows well the Malayan *Utricularias* in the field, does not differ very greatly from *U. racemosa*, Wall.; not so much indeed as does the variety *filicaulis* previously described. It matters little whether the three forms are considered specifically distinct or are treated as manifestations of one protean species. A drawing by Mr. Ridley shows pink flowers.

12. *UTRICULARIA ORBICULATA*, Wall. Cat. 1500. A slender herb growing on wet banks, rocks, or tree-trunks. *Leaves* all radical or on small offsets, persistent, orbicular or orbicular-spathulate, .15 in. across; petioles distinct .15 to .25 in. long; roots fibrous, sometimes with bladders. *Scapes* erect, sub-capillary, 2 to 5 in. long; usually 2-4-flowered, sometimes 6-10-flowered; naked or with one or two empty scales, slightly produced at the base; flowers on capillary pedicels .15 to .25 in. long, rather distant; bracts and bracteoles minute, ovate-acute. *Calyx* 2-lobed, the lower lobe very much smaller than the upper, both obtuse, the upper often emarginate, .12 in. long in fruit and about as broad as long. *Corolla* pale violet or white with a yellow centre, .2 to .25 in. wide, with an explanate 5-lobed lower lip and a linear sub-acute spur .2 in. long about as long as the lower lip. *Capsule* globose, .1 in. across, covered by the upper calyx-lobe but projecting beyond the lower. *Seeds* minute, obovoid, glochidiate throughout the upper thicker half. A. DC. Prod. VIII. 18; Oliv. Journ. Linn. Soc. III. 187; Dalz. & Gibs. Bomb. Flor. 136; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11. *U. pusilla*, Grah. Cat. Bomb. Pl. 165. *U. glochidiata*, Wight Ic. t. 1581.

KEDAH: Telayah Tujon, *Curtis*! PERAK: Larut, *Scortechini* 376! on Gunong Bubu, growing on steep side of hill in the sun, amongst moss, at 5,000 feet, flower pale violet; *Wray* 3880! on Gunong Mas, at 5,000 feet, flower white with yellow centre; *Wray* 4146! MALACCA: Mount Ophir, *Griffith*; *Ridley*!—DISTRIB Throughout S.E. Asia.

Order LXXXVII. BIGNONIACEÆ.

Trees or climbing shrubs, more rarely herbs. *Leaves* opposite, rarely whorled or alternate, entire or 1- 2- 3-pinnate or digitate; leaflets entire or sometimes toothed. *Inflorescence* of terminal racemes or panicles; bracts various; flowers showy, usually large, hermaphrodite, irregular or regular. *Calyx* gamosepalous, campanulate, truncate or spathaceous or 2-5-lobed, valvate. *Corolla* gamopetalous, tubular-ventricose, mouth 2-lipped; lobes 5, sub-equal, patent or erecto-patent, bilabiate imbricate in bud. *Stamens* alternate with the corolla-lobes, inserted on the tube, 5 or more usually 4 from the fifth being absent or rudimentary; filaments filiform, often slightly thickened and sometimes hairy at the base; anthers 2-celled, included or shortly exsert; cells oblong or linear, parallel or divergent, dehiscing longitudinally. *Disk* hypogynous, cushion-like or annular, sometimes absent. *Ovary* sessile or shortly stalked, superior, 1-2-celled; style long, filiform; stigma of 2 flattened ovate or oblong lobes; ovules numerous, usually horizontal, anatropous, inserted in 2 to many rows in vertical lines along the edges of the septum in each cell. *Fruit* generally an elongate capsule, loculicidally or septicidally bivalved; the septum enlarged in fruit, deciduous together with the placentas. *Seeds* transverse, affixed by their margins to the septum or to enlarged placentas, vertically compressed, discoid or trigonous, often with a broad wing, embryo usually enveloped in a fine interior membrane; exalbuminous, cotyledons flattened, sometimes folded, radicle stout, lateral.—**DISTRIB.** Tropical regions of the world, a few in warm temperate regions; absent from Europe, the Mediterranean region and New Zealand. Species about 50.

- Stamens 5; a tree with opposite 2-3-pinnate leaves and very large flat capsules .. .. . 1. *OROXylum*.  
 Stamens 4; trees:—  
   Anther-cells 2, both perfect:—  
     Leaves 1-3-pinnate:—  
       Calyx spathaceous, split on one side .. .. . 2. *DOLICHANDRONE*.  
       Calyx lobed or truncate:—  
         Septum of the capsule cylindric, spongy:—  
           Septum prominently pitted; seeds trigonous, transversely grooved without, inner lobe fitting into the septum-pit; ovules 2-seriate in each cell .. .. . 3. *STEREOSPERMUM*.  
           Septum only faintly pitted; seeds flat; ovules many-seriate in each cell .. .. . 4. *RADERMACHERA*.  
         Septum flat, capsule winged; a large tree with large flowers .. .. . 5. *PAJANELIA*.



- Leaves simple, often verticillate; calyx usually more or less bilabiate .. .. 6. DIPLANTHERA.  
 Anther-cells 1 perfect, 1 reduced to a small hook; a tall tree with 2-3-pinnate leaves and very long narrowly-linear corolla-tube.. .. 7. MILLINGTONIA.

## 1. OROXYLUM, Vent.

A glabrous tree. *Leaves* opposite, large, 2-3-pinnate; leaflets entire. *Flowers* large, in a long, stout, terminal raceme. *Calyx* large, leathery, campanulate, truncate or obscurely toothed, persistent. *Corolla* large, fleshy; tube campanulate-ventricose; lobes 5, 2 in upper, 3 in lower lip, recurved, toothed, crumpled. *Stamens* 5 inserted near base of tube, posterior one the shortest. *Anthers* 2-celled; cells parallel, oblong. *Disk* large, cushion-like. *Ovary* sub-sessile, contracted at the base, compressed; style slender; stigma 2-lobed; ovules in 4 vertical rows on each placenta, very many. *Capsule* very large, broadly linear, compressed parallel to the septum, septifragally 2-valved. *Seeds* very many, flattened, surrounded by a broad hyaline wing.—DISTRIB. A single S.E. Asiatic species.

OROXYLUM INDICUM, Vent. Dec. Gen. Nov. 8 (1808). A small tree, reaching 30 to 40 feet in height, with a clean bole and few branches or often none, the head bearing leaves only; branches thick; bark somewhat fleshy; pith large. *Leaves* extremely large, 1-3-pinnate, the lower 3-, middle ones 2-, upper 1-pinnate; 3 to 5 feet long, triangular in outline; rachis smooth, striate, stout, swollen at the base (pulvinus) and joints; primary pinnae about 45 pairs, the lower ones 2-pinnate at base, pinnules 3- to 5-foliolate; leaflets ovate, entire, acuminate at apex, side ones rounded and often unequal at base, terminal one cuneate at base; 3 to 6 in. long, 2 to 2.5 in. broad; main-nerves 4 to 5 pairs; petiolules slender, .2 to .3 in. long. *Raceme* branch-like, 2 to 3 feet long, very thick, lower part prominently marked with the ovate scars of fallen pedicels; pedicels .5 in. long, stout; bracteoles fused with pedicels. *Calyx* campanulate, 1 in. long, fleshy, truncate, with 5 short teeth. *Corolla* fleshy, 2.5 in. long, yellowish; lobes much crumpled, red, villous on both sides. *Stamens* 5, shortly exsert; base of filaments woolly; anthers divergent below; connective shortly mucronate. *Disk* fleshy, cupular, somewhat lobed. *Ovary* oblong; style slender, hollow, as long as the stamens; stigma 2-lobed, lobes rounded. *Capsule* shortly stalked, concave-flat, elongate oblong, 1.5 to 2.5 feet long, 2.5 to 3.5 in. broad, scarcely .3 in. thick, margins somewhat incurved, back keeled, valves woody, septum flat. *Seeds* very many, flat, surrounded by a very thin, hyaline, shining wing, somewhat rectangular in shape, 3 in. long, 1.5 in. broad; testa membranous; cotyledons emarginate, oblong. Kurz For.



Fl. II. 237; Clarke in Hook. f. Fl. Br. Ind. IV. 378; Trimen Fl. Ceyl. III. 281; Koord. & Val. Bijdr. I. 66; Cooke Bomb. Fl. II. 327; Prain Beng. Plants II. 787. *Bignonia indica*, Linn. Sp. Pl. (1753) 625; Lamk Dict. I. 423; Roxb. Fl. Ind. III. 110; Wall. Cat. 6514. *B. pentandra*, Lour. Fl. Cochinch. 379. *Spathodea indica*, Pers. Syn. II. 173. *Calosanthus indica*, Blume Bijdr. 760; DC. Prod. IX. 177; Wight Ic. t. 1337; Dalz. & Gibs. Bomb. Fl. 161; Bureau Monog. Bign. (1864) t. 9; Miq. Fl. Ind. Bat. II. 752; Brandis For. Fl. 347. "Palega pajaneli," Rheede Hort. Mal. I. t. 43.

PENANG: Curtis 983. PERAK: Scortechini 1613; King's Collector 7033. PAHANG: common on the banks of the river from Pekan up, flowers dull brownish-purple (Ridley in Trans. Linn. Soc. 2nd Ser. III. 326). MALACCA: Maingay (K.D.) 1213.—DISTRIB. India, Ceylon, Burma, Sumatra (Forbes 1284), Java, and east to Cochin China.

## 2. DOLICHANDRONE, Fenzl.

Trees. *Leaves* opposite, pinnate, leaflets entire or toothed. *Flowers* in terminal racemes or panicles, few, large. *Calyx* spathaceous, cleft to the base down the front, caducous. *Corolla-tube* long or short, inflated above; lobes 5, nearly equal, crisped on the margin. *Stamens* 4, didynamous, included; *anthers* glabrous, the cells oblong, at first parallel, afterwards divergent. *Disk* annular, cushion-like. *Ovary* sessile; ovules numerous, usually many-seriate. *Capsule* elongate, terete or somewhat compressed, straight or incurved, loculicidally 2-valved, the septum often thickened and making 4 spurious cells. *Seeds* 1 to  $\infty$ -seriate on the margins of the septum, much compressed, the wing thickened or hyaline.—DISTRIB. Tropical Africa, Asia, and Australia, about 15 species.

DOLICHANDRONE RHEEDII, Seem. Journ. Bot. VIII. 380 (1870). A deciduous tree reaching 40 to 50 feet in height of stem; branchlets stout, marked with prominent leaf-scars, innovations glabrous. *Leaves* imparipinnate, 9 to 12 in. long, leaflets 2 to 4 pairs, with an end one, rachis slender; side leaflets rhomboid, unequal at base, acuminate at apex, margin entire or with few distant serratures, glabrous on both surfaces, 3 to 4 in. long, 1.5 to 2.5 in. broad, main-nerves 6 to 7 pairs, petiolule slender, articulate at base, .3 to .5 in. long; end leaflet similar, but equal at base; all nearly black when dry. *Flowers* few, usually 1 to 4 in a short terminal corymbose raceme; pedicels glabrous, 1 to 1.5 in. long. *Calyx-tube* closed in bud and beaked, spathaceous in flower, 1.5 in. long. *Corolla* white, tubular-funnel-shaped, 4 to 7 in. long; tube slender at first, then gradually expanding; lobes 1 in.

long, crenately crisped, recurved. *Stamens* 4, didynamous; filaments curved inwards; anther-cells large, oblong, divaricate. *Ovary* conical, style slender, stigma of 2 rounded lobes. *Capsule* 1 to 2 feet long, about 1 in. broad, flattened-cylindrical, faintly ribbed, septum thickened in the middle on both sides. *Seeds* very many, overlapping in many rows, rectangular (with the wings), .5 to .7 in. long, .3 in. broad, wings corky; testa membranous; cotyledons flat, deeply emarginate, the lobes nearly orbicular; radicle short. Clarke in Hook. f. Fl. Br. Ind. III. 379; Trimen Fl. Ceyl. III. 282; Koord. & Val. Bijdr. I. 69. *D. longissima*, K. Sch. in Engl. & Prantl Pflanzenfam. IV. 2B. 240, fig. 92 B-D. *Bignonia spathacea*, Linn. f. Suppl. 283. *B. longissima*, Lour. Fl. Cochinch. 380? *Spathodea longiflora*, Vent. Choix. n. 40. *S. Rheedii*, Wall. Cat. 6516; DC. Prod. IX. 206; Wight Ic. t. 1339; Bedd. Fl. Sylv. CLXVIII.; Kurz For. Fl. II. 234; Miq. Fl. Ind. Bat. II. 754. *S. ? Loureiriana*, DC. l.c. 209? *S. Diepenhorstii*, Miq. l.c. "Nir Pongelion," Rheedee Hort. Mal. VI. t. 29.

PENANG: Curtis 1184. PERAK: *Scortechini* 1098; *Wray* 2501. PAHANG: in mangrove swamps (*Ridley* l.c.). MALACCA: *Griffith* (K.D.) 4066; *Maingay* (K.D.) 1210.—DISTRIB. Malabar coast of India, Ceylon, Burma, Andaman Islands, Malay Archipelago east to New Guinea.

### 3. STEREOSPERMUM, Cham.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire or sometimes toothed. *Flowers* in large lax terminal panicles, white pink or yellow. *Calyx* ovoid, open or closed in bud, truncate or shortly unequally lobed in flower. *Corolla* campanulate or funnel-shaped; mouth bilabiate, upper lip 2-, lower 3-cleft; lobes nearly equal, rounded, crisped, toothed or lacinate. *Stamens* 4, didynamous, included fifth rudimentary; anthers glabrous, cells linear divergent. *Ovary* sessile, elongate, 2-celled; ovules numerous, 2-seriate in each cell. *Disk* cupular, fleshy. *Capsule* elongate, terete or somewhat angled, loculicidally 2-valved; septum thick, corky, cylindrical, pitted to receive the seeds in alternating cavities. *Seeds* trigonous, with a transverse groove without and a prominent ridge within, which fits into a deep pit in the septum; wings membranous, lying flat upon the septum; cotyledons folded, 2-lobed, radicle straight.—DISTRIB. Tropical Asia and Africa. About 12 species.

STEREOSPERMUM FIMBRIATUM, DC. Prod. IX. 211 (1844). A large deciduous tree, reaching 70 to 80 feet in height of stem and 1.5 to 3 feet in diam.; bark grey, rough; branchlets stout, innovations and inflorescence viscid-pubescent. *Leaves* imparipinnate, 1 to 2 feet long; rachis

grooved, viscid-pilose; leaflets 7-9, side ones opposite slightly unequal at base; end one equal, oblong-lanceolate, long-acuminate at apex, rounded at base, entire, membranous, viscid-pilose at any rate when young, afterwards glabrescent on upper surface; 4 to 6 in. long, 1.5 to 1.75 in. broad; midrib slender, main-nerves about 7 pairs, curving upwards to and along the margin, reticulations prominent, transverse; petiolules of side leaflets .3 to .4 in. long, of end one 1-1.5 in., articulate. *Panicle* large, very viscid-pilose, dichotomously branched, 5 to 9 in. long and broad; peduncle short, about .5 in. long, thick, secondary peduncles 1 to 1.5 in. long; pedicels slender, about .5 in. long; bracteoles very small, subulate, early caducous. *Flowers* pale lilac, the tube rather darker. *Calyx* campanulate, viscid-pubescent without, glabrous within, .5 in. long; lobes 5, rounded, very short, long-apiculate. *Corolla-tube* funnel-shaped, .1 to .15 in. long; lobes 5, as long as tube, spreading, long-fimbriate, the laciniae .025 in. long. *Stamens* 4, didynamous; filaments slender, glabrous; anther-cells linear-oblong, divaricate, recurved, .05 in. long. *Ovary* cylindric, glabrous; style slender, stigma 2-lobed. *Capsule* cylindric, more or less quadrangular, torulose, 1 to 2 feet long, .5 in. in diam.; septum thick, corky. *Seeds* trigonous, with rather thick wings; 1 in. long, .3 in. broad, deeply immersed in alternate pits in the septum. Kurz For. Fl. II. 231; Clarke in Hook. f. Fl. Br. Ind. IV. 383. *Bignonia fimbriata*, Wall. Cat. 6500.

JUNKSEYLON (Tongkah): *Curtis* 2912. PERAK: *Wray* 3334; *Scortechini* 1746; *King's Collector* 5701. PAHANG: *Ridley* l.c. MALACCA: *Maingay* (K.D.) 1211.—DISTRIB. Burma.

#### 4. RADERMACHERA, Zoll & Mor.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire. *Flowers* in terminal racemes or panicles, showy. *Calyx* urceolate, open or closed in bud, entire or shortly lobed in flower. *Corolla* funnel-shaped; tube narrow, mouth more or less 2-lipped, upper lip 2-, lower 3-lobed, the lobes spreading, rounded. *Stamens* 4, didynamous, with a fifth sterile one, included; filaments slender; anthers 2-celled, the cells divaricate. *Disk* cupular, fleshy, entire. *Ovary* cylindrical; cells 2; ovules very numerous in many rows in each cell. *Capsule* slender, compressed, terete, often spirally twisted; the septum slender, continuous, cylindric or compressed, very faintly pitted and bearing on each side a double row of seeds. *Seeds* very small, rounded, flattened, resting on a very slight depression but not sunk in the septum; wings hyaline, shining; cotyledons flat, not lobed; radicle minute.—DISTRIB. Burma, the Malay Peninsula, and Malay Archipelago. About 8 species.

Leaves 1-pinnate, leaflets prominently glandular at base, capsule under 10 in. long .. .. .	1. <i>R. glandulosa</i> .
Leaves 2-3-pinnate, leaflets not glandular at base, capsule over 15 in. long .. .. .	2. <i>R. amena</i> .

1. *RADERMACHERA GLANDULOSA*, K. Sch. in Engl. & Prantl Naturl. Pflanzenfam. IV. 3B, 243 (1894). A small tree with spreading branches, reaching 15 to 30 feet in height and 6 to 12 in. in diam. of stem.; branches stout, with pale brown, corky bark; branchlets smooth, with prominent oblong lenticels; innovations slightly puberulous. *Leaves* imparipinnate, 15 to 20 in. long; rachis smooth, swollen at the nodes and at the base, glabrous; leaflets 3 to 7, side ones opposite, slightly unequal at base, end one equal, all furnished with prominent large glands at the base above the petiolule, elliptic or elliptic-oblong, acute or abruptly acuminate at apex, rounded at base, entire, glabrous, chartaceous, 5 to 10 in. long, 3 to 5 in. broad; midrib slender, main-nerves 9 to 11 pairs, arching upwards to and along the margin; reticulations transverse, prominent; petiolules .3 to .4 in. long, end one 1 in. long. *Panicles* terminal and occasionally axillary, 6 to 12 in. long; peduncle often very long, branches short, scarcely .5 in. long, few-flowered; pedicels slender, .2 to .4 in. long; bracteoles minute, caducous; flowers white, shaded with pink, calyx red. *Calyx* campanulate, truncate, persistent, .15 in. long, glabrous, margin undulate only. *Corolla-tube* cylindric below for .5 in., then campanulate for nearly 1 in., .5 in. wide at mouth, glabrous without, slightly pubescent within; lobes 5, 2 upper smaller than 3 lower, .3 in. long, margins slightly crispate-ciliate. *Stamens* 4, didynamous, included; filaments slender, anther-cells linear, .1 in. long, divaricate, sterile stamens clavate. *Disk* cupular, glabrous. *Ovary* oblong; style slender, .75 in. long; stigmas 2, oblong. *Capsule* slender, terete, 6 to 10 in. long, .25 in. broad; valves thin, chartaceous, flat after dehiscence, slightly keeled on back; septum cylindric, slightly pitted, white, spongy. *Seeds* very many, flat, .6 to .8 in. long and .05 to .1 in. broad (including the hyaline often fimbriate wings); testa membranous; cotyledons flat, oblong, broader than long (.05 in.); radicle minute. *R. stricta*, Zoll.; Bureau Monog. Bign. t. 28. *Spathodea glandulosa*, Blume Bijdr. 762; DC. Prod. IX. 207; Miq. Fl. Ind. Bat. II. 755. *Bignonia Porteriana*, Wall. Cat. 6509; DC. l.c. 165. *Lagaropyxis glandulosa*, Miq. in Ann. Mus. Lugd. Bat. I. 199. *Stereospermum glandulosum*, Miq. Fl. Ind. Bat. Suppl. 565; Clarke in Hook. f. Fl. Br. Ind. IV. 333; Koord. & Val. Bijdr. I. 74.

PENANG: *Wallich* 6509; *Curtis* 140. PERAK: *Wray* 1346, 2143; *Scortechini* 114, 1156; *King's Collector* 3353, 6379; *Kunstler* 981. MALACCA: *Maingay* (K.D.) 1217; *Goodenough* 1960. SELANGOR: *Ridley*



8537. NEGRI SEMBILAN: Goodenough 1860. PAHANG: Ridley l.c.—  
DISTRIB. Burma (Lobb), Sumatra (Forbes 2663, 2693), Java, Borneo  
(Beccari 811).

2. *RADERMACHERA AMENA*, Seem. Journ. Bot. VIII. 146 (1870). A very tall tree, reaching 80 feet in height, all parts glabrous; branches thick, with prominent leaf-scars. *Leaves* 2-3-pinnate, apparently 2 feet long or longer, the lower pinnae only again divided, the upper ones simply pinnate; rachis smooth, thick, swollen and articulate at the nodes, enlarged at foot; petiole about 6 in. long, all joints easily separating when dry; leaflets oblong-lanceolate when young, elliptic-oblong when old, shortly and abruptly blunt-acuminate at apex, rounded or attenuate at base and slightly decurrent, glabrous, entire, coriaceous, 4 to 6 in. long, 2 to 3 in. broad; midrib thick, impressed above, main-nerves about 10 pairs, joined at about .25 in. from the margin in a looped nerve, secondary nerves alternate with the main-nerves, reticulations obscure; petiolules .4 or .5 in. long, channelled above by the decurrent margins of the blade. *Panicles* much and usually trichotomously branched, rachis terete, upper branches channelled; peduncle about 5 in. long; pedicels slender; bracteoles minute, rounded; flowers white, tinted with pink outside and with yellow streaks within; the calyx dark red. *Calyx* in bud closed, in flower 2-lipped, the lips bluntly apiculate; tube and lobes equal, .3 in. long, glabrous, deciduous. *Corolla-tube* shortly cylindric at first for .2 to .3 in. long, then campanulate, glabrous; lobes nearly equal, rounded, crenulate on the margins, .2 to .3 in. long. *Stamens* 4, with an abortive fifth; filaments thickened and glandular-hairy below, slender and glabrous above; anther-cells linear, curved, divaricate, the connective prominently apiculate. *Disk* cupular, glabrous. *Ovary* oblong, flattened; style slender, as long as tube; stigma bilobed, lobes lanceolate; cells 2, ovules very many. *Capsule* slender, torulose, 12 to 18 in. long, 3 in. broad; valves thin, chartaceous, flattened after dehiscence and then .25 in. broad, keeled on the back; septum cylindric, spongy, speedily caducous, bearing on each border a row of small seeds. *Seeds* (with wings) .75 in. long, .1 to .15 in. broad, wings hyaline, rounded; testa membranous; cotyledons flat, oblong, longer than broad; radicle minute. Kurz For. Fl. II. 232. *R. gigantea* and *R. Lobbii*, Miq. in Ann. Mus. Lugd. Bat. III. 250. *Spathodea amena*, DC. Prod. IX. 208. *S. Lobbii*, Teys. & Binn. in Nat. Tijdsch. XXV. 413. *Spathodea gigantea*, Bl. Bijdr. 761; Miq. Fl. Ind. Bat. I. 755; DC. l.c. 207. *Bignonia amena*, Wall. Cat. 6512 and Pl. As. Rar. II. 78. t. 183. *Lagaropyxis gigantea*, Miq. in Ann. Mus. Lugd. I. 198. *Stereospermum hypostictum*, Clarke in Hook. f. Fl. Br. Ind. IV. 384; Koord. & Val. Bijdr. I. 72.

PERAK: *Scortechini* 1496; *Wray*. MALACCA: *Griffith* (K.D.) 4070; *Maingay* 1212 (*part*). SINGAPORE: *Maingay* (K.D.) 1212 (*part*); *Cantley* 79,204.—DISTRIB. Tavoy, Java.

##### 5. PAJANELIA, DC.

A large tree, glabrous except the flowers. *Leaves* large, imparipinnate; leaflets entire, numerous. *Flowers* large, in large terminal thyrsoid panicles, dark red. *Calyx* large, ovoid and closed in bud, in flower ventricose-campanulate; lobes 5. *Corolla-tube* cylindric below, ventricose-campanulate above, wide at the mouth; limb sub-bilabrate, lobes 5, spreading, recurved, unequal. *Stamens* 4, with a rudimentary fifth, didynamous, sub-exsert; filaments slender; anthers glabrous, cells oblong, divergent. *Disk* annular. *Ovary* 2-celled, ovules on each placenta numerous,  $\infty$ -seriate. *Fruit* an elongate narrowly oblong capsule, loculicidally dehiscing, the septum contrary to the valves, the margins of the valves extended in broad wings. *Seeds* in several rows on the edges of the septum, compressed, with hyaline wings; cotyledons flat, radicle small.—DISTRIB. A single S.E. Asiatic species.

PAJANELIA MULTIJUGA, DC. Prod. IX. 227 (1845). A large evergreen tree, reaching 60 to 80 feet in height and 2 feet in diam. of stem; glabrous except the corolla; bark .25 in. thick, dark grey, rough; branches thick, lenticellate. *Leaves* imparipinnate, 1.5 to 3 feet long, glabrous; rachis angular; leaflets 10 to 12 pairs with a terminal one, very unequal-sided, elliptic-ovate, acute at apex, rounded at base on the upper, cuneate on the lower side, chartaceous, margins entire recurved, 4 to 8 in. long, 2.5 to 3.5 in. broad; midrib slender, main-nerves 9 on upper, 7 on lower side, reticulations transverse; petiolule stout, .2 to .3 in. long. *Panicles* thyrsoid, 12 to 18 in. long; rachis stout, fleshy, lenticellate; primary branches 1 to 2 in. long, similar, secondary ditrichotomously branched; pedicels .5 in. long; bracteoles minute; flowers large, pale yellow, throat purple within. *Calyx* closed in bud, in flower campanulate, 1 to 1.5 in. long; tube broad at base with keel-like folds without, lobes 5, irregular, acute. *Corolla* 2 to 2.5 in. long, cylindric below, then somewhat constricted, then ventricose-campanulate; lobes 5, unequal, at first parallel-sided, then broadening into a blunt rounded crispately crenulate limb; the upper part of the tube and the lobes, especially on the margin, grey-pubescent. *Stamens* 4 with a rudimentary fifth, didynamous; filaments slender, glabrous; anther-cells oblong, divergent. *Disk* annular, pulvinate, glabrous. *Ovary* sessile, oblong; style slender, angled, broadening upwards into a 2-lobed clavate stigma; cells 2, ovules very numerous. *Capsule* flat, lanceolate, broadly winged, the wings split, glabrous, 1 to 1.5 feet long, 2 to 2.5 in. broad; septum

transverse, quadrangular in section. *Seeds* exceedingly numerous, in many rows and imbricating, curved; furnished at either end with a very thin hyaline wing, seeds and wing reaching 1·5 in. long and ·5 in. broad; testa membranous; cotyledons obcordate, flat; radicle slender. Bureau Monog. Bign. t. 20; Kurz For. Fl. II. 237. *P. Rheedii*, Wight Ic. tt. 1343-4; Clarke in Hook. f. Fl. Br. Ind. III. 384; Bedd. Fl. Sylv. CLXIX.; Cooke Bomb. Fl. II. 333; Prain Beng. Plants II. 790. *Bignonia indica*, var.  $\beta$  Linn. Sp. Pl. 871; Lour. Fl. Cochinch. 460. *B. Pajanelia*, Ham. in Trans. Linn. Soc. XIII. 316. *B. longifolia*, Willd. Sp. Pl. III. 306; K. Sch. in Engl. & Prantl Pflanzenfam. IV. 3B, 244. *B. multijuga*, Wall. Cat. 6503 and Pl. As. Rar. 1. 81, tt. 95, 96. "*Pajaneli*," Rheede Hort. Mal. I. 44.

PENANG: Jack. PERAK: *Scortechini*; King's Collector 2616, 3958.  
—DISTRIB. Eastern Bengal, Burma, Andaman Islands, Malabar coast.

#### 6. DIPLANTHERA, Banks & Solander.

Trees, more or less hairy. *Leaves* undivided, large, opposite or whorled. *Flowers* large, yellow, in short thick panicles among the uppermost leaves, the primary branches of the panicles shortly verticillate and densely cyme-bearing. *Calyx* campanulate, oblong and closed when young, with 2 to 5 valvate lobes connivent in flower and sometimes sub-bilabiate. *Corolla* tubular-ventricose; lobes 5, rounded, sub-equal. *Stamens* 4, didynamous, exsert; filaments involute in bud; anthers glabrous; cells linear, at first parallel, afterwards divaricate. *Disk* thick, pulvinate. *Ovary* sub-sessile, ovules densely many-seriate. *Capsule* oblong-fusiform, woody, loculicidally 2-valved; septum flat, thick. *Seeds* many-seriate, between the margins of the septum, flattened, with a broad hyaline wing.—DISTRIB. From the Malay Peninsula to New Caledonia and Australia: about 6 species.

DIPLANTHERA BANCANA, Scheffer in Nat. Tijdschr. XXXI. 334 (1870). A lofty tree; branches stout; branchlets pale brown, pubescent, marked with lenticels and prominent leaf-scars. *Leaves* chartaceous, undivided, ovate, obtuse at apex, cordate at base; margins irregularly undulate, furnished with 1 to 2 glandular pits on the upper surface at the insertion of the petiole; both surfaces slightly pubescent, especially beneath and on the nerves; 8 to 13 in. long, 5 to 8 in. broad; midrib stout, main-nerves 10 to 12 pairs, the lowest 3 close together and spreading more or less downwards or horizontally, the rest distant, irregular, often branched at two-thirds of their length, the branches all anastomosing near the margin; reticulations prominent, transverse; petiole stout, 2 to 4 in. long, base articulate. *Panicles* terminal, 4 to 5 in. in diam., tawny-villous; common peduncle 5 to 6 in. long, ·25 in. thick;



branches easily disarticulating; pedicels slender, .75 in. long; bracts leafy, spatulate, .2 in. long; bracteoles linear-subulate, .1 to .2 in. long; flowers yellow. *Calyx* campanulate, closed in bud, 5-lobed in flower, .7 to .8 in. long; often 2-labiate, the upper lip with 2 divisions of 2 lobes each, the lower 1-lobed, acute; tube puberulous without. *Corolla* tubular-ventricose, 1 in. long; lobes 5, uppermost and 2 lowest acute; side lobes broadly obtuse, margins incurved; tube glabrous except for a ring of tawny hairs at the insertion of the filaments. *Stamens* 4, filaments inserted a little above the base of the tube, involute in bud; anther-cells linear, pendulous. *Ovary* oblong; style slender; stigmas 2, lanceolate; ovules very many. *Capsule* 6 in. long, 1.2 in. broad, smooth, valves boat-shaped after dehiscence. *Seeds* 1.5 in. long, .75 in. broad, winged on 3 sides; cotyledons flat, emarginate, .15 in. long, .25 in. broad. Clarke in Hook. f. Fl. Br. Ind. IV. 385.

PENANG: Curtis 870, 1569. MALACCA: Walker 283; Maingay (K.D.) 1214.—DISTRIB. Bangka (Teysmann 7666).

#### 7. MILLINGTONIA, Linn. f.

A tall tree with corky bark. *Leaves* opposite, 2-3-pinnate; leaflets entire or crenate. *Flowers* white, in terminal corymbose panicles. *Calyx* small, cupular, truncate or with 5 short teeth. *Corolla* white; tube long, slender; limb obscurely bilabiate; lobes 5, sub-equal, sub-valvate, the 2 upper connate to near the middle. *Stamens* 4, didynamous, with no rudimentary fifth, shortly exsert, inserted on the mouth of the tube; anthers 1-celled, the second cell rudimentary, hooked. *Disk* annular, cushion-like. *Ovary* sub-sessile, cylindric-conical; style slender; stigma bi-lobed; ovules numerous, in about 4 rows on each placenta. *Capsule* linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* very many, flattened, surrounded on 3 sides by a thin hyaline wing.—DISTRIB. A single S.E. Asiatic species.

MILLINGTONIA HORTENSIS, Linn. f. Suppl. 291 (1781). A tall erect tree reaching a height of 80 feet and a girth of 6 to 12 feet; bark corky, deeply fissured; branches stout, drooping; branchlets somewhat slender, flattened, lenticellate; innovations and young leaves slightly pubescent. *Leaves* opposite, 2-3 pinnate, about 1.5 to 2 feet long or longer; rachis angular, channelled; leaflets ovate or ovate-lanceolate, acuminate at apex, truncate at base, membranous; glabrous when old, pubescent when young; margins entire or (in young plants and shoots chiefly) broadly crenate; 1 to 2 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces as are the 4-5 pairs of main-nerves; petiolules slender, in upper leaflets often none. *Panicles* 8 to 12 in. long, branches divaricate; rachis somewhat angular, flattened; peduncles



1 to 3 in. long; bracts and bracteoles very small, caducous; pedicels slender, .3 to .4 in. long; flowers white. *Calyx* cupular, .1 in. long; lobes very shallow, rounded, recurved. *Corolla-tube* very slender, 1.5 to 2.5 in. long, about .07 to .1 in. broad, glabrous; lobes ovate-oblong, acute, pubescent within, .5 to .6 in. long, .2 to .3 in. broad. *Stamens* inserted at the top of the tube; filaments slender, .4 to .5 in. long; anthers rounded, ovate. *Ovary* slender; style very slender, exsert, stigma-lobes ovate. *Disk* cushion-like, .05 in. high. *Capsule* about 12 to 15 in. long and .75 in. broad, acute at both ends; valves woody, septum ultimately free. *Seeds* in several rows along the margins of the septum, much overlapping, including the wing about 1 in. by .5 in.; wing narrow at the apex, hyaline. DC. Prod. IX. 182; Wight Ill. 16 bis fig. 6; Bureau Monog. Bign. t. 8; Bedd. Fl. Sylv. Madr. t. 249; Brandis For. Fl. 347; Kurz For. Fl. II. 238; Clarke in Hook. f. Fl. Br. Ind. IV. 377; Cooke Bomb. Fl. II. 334; Prain Beng. Plants 788. *Bignonia Azedarachta*, Koen. Ann. Bot. I. 178. *B. suberosa*, Roxb. Cor. Pl. III. 11, t. 214 and Fl. Ind. III. 111; Wall. Cat. 6513.

MALACCA: *Maingay* (K.D.) 1215. SINGAPORE: *Deschamps*.—  
DISTRIB. India, Burma (*fide* Kurz), Sumatra (*Miq. Fl. Ind. Bat. Suppl.* 565).

Whether the specimens were gathered from really wild trees there is nothing to show, but if Kurz is right in his statement that the cork-tree, so well known in India in cultivation, is wild in tropical forests from Martaban to Tenasserim, it may well occur in a wild state further south in the Peninsula.

#### Order LXXXVIII. PEDALINEÆ.

[By D. PRAIN.]

Herbs or undershrubs. *Leaves* opposite or the upper alternate, entire toothed or lobed; stipules 0. *Flowers* irregular, solitary or, rarely, clustered or racemose, usually axillary; pedicels short; bracts minute or 0. *Sepals* 4-5, slightly connate below. *Petals* connate in a tubular-ventricose corolla; limb 5-lobed, obscurely 2-lipped; lobes imbricate. *Stamens* 4, didynamous, rarely 2. *Carpels* 2, connate in a 2-celled, rarely 1-celled ovary; ovules many or few, superposed; style filiform; stigma shortly 2-lobed. *Fruit* hard, indehiscent, or a 2- (less often 3-4-) valved capsule. *Seeds* without wings; albumen 0.—DISTRIB. Species about 40, in tropical and sub-tropical countries.

#### SESAMUM, Linn.

Erect or prostrate herbs. *Leaves* opposite below, alternate above, entire toothed, lobed, or divided. *Flowers* axillary, solitary or few and

fascicled, shortly pedicelled. *Sepals* connate in a small 5-partite calyx. *Corolla* 2-lipped; tube ventricose; lobes rounded, those of the upper lip rather smaller than the others. *Stamens* 4, didynamous, included; anthers sagittate, cells sub-parallel, distinct. *Carpels* connate in a 2-celled ovary; cells soon divided into two chambers by a false dissepiment intruded between the placentas; ovules many, 1-seriate in each chamber; style filiform; stigma 2-lobed. *Fruit* an oblong or ovoid capsule, usually 4-angled and 4-grooved, 4-chambered, loculicidally 2-valved. *Seeds* many, obliquely oblong, somewhat compressed, foveolate.—DISTRIB. Species 10, Africa and S.E. Asia.

SESAMUM INDICUM, DC. Prod. IX. 250. An erect pubescent or puberulous herb, 1 to 2 feet high. *Leaves* oblong or ovate, variable, the lower often lobed or pedatisect, the middle ovate, toothed; the upper often narrow-oblong, sub-entire; blade 3 to 5 in. long; petioles .5 to 2 in. *Flowers* axillary, solitary rarely 2-3-nate; pedicels .5 in. long. *Calyx-lobes* .25 in. long, lanceolate. *Corolla* pubescent, 1.25 in. long, whitish or with red, or purplish, or yellow marks. *Capsule* oblong, tetragoneous, erect, scabrid-pilose, 1 in. long, uniformly .25 in. wide throughout; apex usually shortly acuminate; dehiscence usually by 2 valves half-way down, sometimes to the base, and sometimes each valve subsequently divided. *Seeds* brown, smooth. Wall. Cat. 6408; Wight Ill. 153; Hook. f. Flor. Brit. Ind. IV. 387; Bot. Mag. t. 1688. *S. orientale*, Linn. Sp. Pl. 634; Gaertn. Fruct. II. 132 t. 110; Lamk Ill. t. 528; Roxb. Flor. Ind. III. 100. *S. luteum*, Retz. Obs. VI. 31; DC. Prod. IX. 250. *S. occidentale*, Her. & Reg., DC. Prod. IX. 250; Thw. Enum. 442. Rumph. Herb. Amb. t. 76, f. 1. Rheede Hort. Malab. IX. tt. 54, 55.

PENANG: Wallich! King! PERAK: Wray! Scortechini! MALACCA: Derry! JOHORE: Fielding! SINGAPORE: Hullett!—DISTRIB. Cultivated in all hot countries.

